

# Perceptions and Anxiety Level of Students during Administration of Local Anesthesia

Beenish Abbas, Sana Abbas, Muhammad Umair, Ramesha Azam, Majida Rahim, Batool Zara

## ABSTRACT

**Objective:** To assess perceptions and anxiety levels of dental students during administration of local anesthesia

**Study Design & Setting:** This comparative cross sectional study was conceived in Foundation University Dental College and conducted in multiple institutes after endorsement from the ethical committee of the university from August – October 2021.

**Methodology:** The questionnaire comprised of three sections which included demographic profile section, perceptions, and experience of administration of mandibular, maxillary, or inferior alveolar nerve block on the 5-point Likert's scale and comparative anxiety analysis before, during or after local anesthetic administration with interval scale of anxiety response.

**Results:** It was found that 311 (81.8%) dental students/professionals were anxious (cumulative response of "little nervous" and above) before administering local anesthesia injection. It was found that students were significantly more anxious during and after local anesthesia administration as compared to clinical practitioners ( $p < 0.001$ ). About 89% of the responders agreed to the usefulness of video demonstration while 98% agreed to the usefulness of hands-on practice of local anesthesia administration techniques

**Conclusion:** Students were significantly more anxious during and after local anesthesia administration as compared to clinical practitioners. Video demonstration and hands-on practice are useful adjuvants in the reduction of local anesthesia administration anxiety.

**Key Words:** Anxiety, Local Anesthesia, Students

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## INTRODUCTION:

Administration of local anesthesia is associated with increased dental anxiety scores, being considered as the most anxiety-provoking procedure. Understanding and acquiring accurate knowledge and skill to deliver local anesthesia injection using accurate technique is an essential component of dental curriculum. Dental anxiety is the leading cause of patient nonattendance leading to delay in seeking dental care which significantly impacts oral health-related quality of life.<sup>1</sup> Dental student must acquire competency in delivering pain free infiltration and block anesthesia for restorative and surgical procedures and successful management of orofacial pain. Successful administration of painless local anesthesia is vital to allow stress-free dental management safe and effective delivery of local anesthesia may cause significant doctor and patient anxiety which require rigorous student training.<sup>2</sup> One of the key skills in dentistry is competent to administer local anesthesia. There are considerable variations in dental curricula as far as mode of teaching is concerned some dental schools use preclinical teaching or non-human simulators while in other dental schools students have to perform their first injection on humans which provokes considerable anxiety. Pain-free delivery of dental care may

be the reason for a patient choosing their dentist. The dentist must be confident enough and projects this confidence towards their patients to reduce anxiety-induced psychogenic reactions like nausea, vomiting, hyperventilation, and syncope.<sup>3</sup> To significantly improve students' confidence while the delivery of local anesthesia teaching methods other than direct clinical training can be helpful like video demonstrations, use of anatomically correct models designed to verify that correct landmarks have been hit during local anesthesia delivery. Difference in teaching can have a significant influence on student's anxiety level. This further emphasizes the significance of acquiring accurate skill during delivering effective local anesthesia injection in oral cavity.<sup>4</sup> Teaching strategies for local anesthesia include lectures, literature studies, focus groups, and demonstrations. The practical session involves step-by-step administration of local anesthesia to the patient under teacher supervision. One of significant requirements of quality assurance is obtaining student feedback and appropriate evaluation mechanism. Feedback is important to assure best possible training is delivered to undergraduate dental students.<sup>5</sup>

Recent literature has shown that video demonstration is very effective to improve student confidence in psychomotor skills.<sup>6,7</sup> Real-time virtual reality learning experience has been introduced as an educational tool to enhance the clinical learning of students.<sup>8</sup> Contextually, learners in dental school deliver their first injection directly on patients under supervision of teachers to reduce patients anxiety and build confidence. Recently simulations are being used in various fields to acquire necessary psychomotor skills before real-time clinical application.<sup>9</sup> Mobile devices today provide students access to wide resources of educational resources mobile aided learning or m-learning can be used by master anatomical landmarks and students can have more access to educational video demonstrations.<sup>10</sup> Therefore, this study is aimed to assess perceptions and anxiety levels of dental students during administration of local anesthesia

#### **METHODOLOGY:**

This comparative cross-sectional study was conducted in Foundation University Dental College and multiple institutes after the research was approved by institutional review board of the university from August – October 2021 (ERC Number – FUCD/632/ERC/015).

The required sample size is 380, calculated by the WHO online sample size calculator, where the prevalence of anxiety was 46.0% (12) among dental students before and during the injection procedure, 95% confidence level, 80% study power, and 10% precision.<sup>11</sup>

A total of 380 dental students from 3<sup>rd</sup> year to final year and dental professionals having less than 2years experience were recruited by consecutive nonprobability sampling technique.

The written consent and elaboration of the study protocol were given to the participants before data collection. Whereas

dental professionals with experience greater than 2years, working in teaching faculty and enrolled in dental specialization program were excluded. The investigation tool was a close-ended, validated, and structured questionnaire devised on previous studies on the subject. The questionnaire comprised of three sections which included demographic profile section, perceptions, and experience of administration of mandibular, maxillary, or inferior alveolar nerve block on the 5-point Likert's scale (1 – strongly disagree, 2 – disagree, 3 – neutral, 4 – agree, and 5 – strongly agree) and comparative anxiety analysis before, during or after local anesthetic administration with interval scale of anxiety response with seven parameters (Calm and relaxed, a little nervous, tense and upset, afraid, very afraid, panicked, and terrified).<sup>12</sup>

#### **RESULTS:**

There were 380 subjects included in this study. The majority of them were females, n=296 (77.9%) and most of the participants belonged to the younger age group of 21-30 years, n=273 (71.8%). Third- and fourth-year students comprised the major chunk of the sample, n=207 (54.4%), whereas n=81 (21.3%) were house officers and n=92 (24.2%) were demonstrators. The number of patients dealt on daily basis ranging from 10-15 for most of the participants as shown in table 1.

A total of 206 (54.2%) participants agreed that their hands shivered while administering the first local anesthesia injection during a dental procedure, n=252 (66.3%) reported that they faced difficulty in determining the landmarks while giving an injection, while n=294 (77.3%) were worried about the complications that could occur during the administration of local anesthesia injection. Most of the responders, n=239 (62.8%) agreed that delivery of local anesthesia was stressful to both the patient and the dentist, similarly, n=336 (88.4%) thought that anxiety of the administrator affects the patient's cooperation during anesthesia administration. Detailed responses to the anxiety questionnaire are summarized in table 2.

It was found that n=311 (81.8%) dental students/professionals were anxious (cumulative response of "little nervous" and above) before administering local anesthesia injection, n=261 (68.6%) were anxious during administering the injection while n=167 (43.9%) were anxious after local anesthesia administration as shown in figure 1. Anxiety was at the peak before local anesthesia administration, which reduced during administration and further reduced after administration. Table 2 gives a detailed summary of the level of anxiety among study participants before, during, and after local anesthesia administration.

It was found that students were significantly more anxious during ( $p < 0.001$ ) and after ( $p < 0.001$ ) local anesthesia administration as compared to house officers and demonstrators, similarly responders dealing with a lesser

Table 1: Responses to the anxiety questionnaire regarding the first experience of local anesthesia administration during the dental procedure (n=380)

Questions	Responses n(%)				
	1	2	3	4	5
1. Hands shivered while giving the first injection	17 (4.5%)	55 (14.5%)	102 (26.8%)	143 (37.6%)	63 (16.6%)
2. Anxious during your first LA administration	16 (4.2%)	34 (8.9%)	68 (17.9%)	184 (48.4%)	78 (20.5%)
3. It was difficult to determine the landmarks while giving the injection	15 (3.9%)	27 (7.1%)	86 (22.6%)	184 (48.4%)	68 (17.9%)
4. I was worried about the complications that would occur during LA injection	17 (4.5%)	13 (3.4%)	56 (14.7%)	248 (65.3%)	46 (12.1%)
5. Failure to achieve anesthesia is the most common complication of LA administration	9 (2.4%)	81 (21.3%)	123 (32.4%)	150 (39.5%)	17 (4.5%)
6. Patient was comfortable during your injection	2 (0.5%)	53 (13.9%)	140 (36.8%)	164 (43.2%)	21 (5.5%)
7. Delivery of LA gives stress to both the patient and the dental student	4 (1.1%)	23 (6.1%)	114 (30.0%)	223 (58.7%)	16 (4.2%)
8. Anxiety levels of students will have an impact on patient's cooperation during LA administration	0 (0.0%)	17 (4.5%)	27 (7.1%)	284 (74.7%)	52 (13.7%)
9. Simulations (with model/cadaver) would be better for first injection administration	0 (0.0%)	9 (2.4%)	45 (11.8%)	235 (61.8%)	91 (23.9%)
10. Student-to-student administration of LA is an effective method of training dental students regarding local anesthetic techniques	44 (11.6%)	149 (39.2%)	100 (26.3%)	72 (18.9%)	15 (3.9%)
11. First LA injection directly on patient will help to provide a realistic experience	3 (0.8%)	37 (9.7%)	69 (18.2%)	228 (60.0%)	43 (11.3%)
12. Supervision from teachers is not required for the next injection to be administered	52 (13.7%)	223 (58.7%)	45 (11.8%)	55 (14.5%)	5 (1.3%)
13. Good theoretical knowledge of LA is essential before administering LA injection	1 (0.3%)	12 (3.2%)	23 (6.1%)	207 (54.5%)	137 (36.1%)
14. More emphasis should be laid on LA teaching methodology in dental curriculum	0 (0.0%)	6 (1.6%)	64 (16.8%)	220 (57.9%)	90 (23.7%)
15. LA administration teaching programs are the same across the globe	12 (3.2%)	134 (35.3%)	164 (43.2%)	59 (15.5%)	11 (2.9%)

number of patients on daily basis were found to be more anxious before ( $p < 0.001$ ), during ( $p < 0.001$ ) and after ( $p < 0.001$ ) local anesthesia injection administration as shown in table 4. About 89% of the responders agreed for the usefulness of video demonstration while 98% agreed about usefulness of hands-on practice of local anesthesia administration technique as shown in figure 2.

**DISCUSSION:**

It was found that n=311 (81.8%) subjects were anxious (cumulative response of “little nervous” and above) before administrating local anesthesia injection in dental patients, n=261 (68.6%) were anxious during administrating the injection while n=167 (43.9%) were anxious after local anesthesia administration. Hence, anxiety was at the peak before local anesthesia administration, which reduced during

administration and further reduced after administration. Additionally, students were significantly more anxious during ( $p < 0.001$ ) and after ( $p < 0.001$ ) local anesthesia administration as compared to house officers and demonstrators, similarly responders dealing with a lesser number of patients on daily basis were found to be more anxious before ( $p < 0.001$ ), during ( $p < 0.001$ ) and after ( $p < 0.001$ ) local anesthesia injection administration.

Administration of local anesthesia effectively constitutes the backbone of dental treatment with the affirmation of patient comfort and analgesia. Therefore endeavors are to be ensured at students and early practical levels for safe application of theoretical knowledge on the patient in terms of delivering local anesthetic without compromising patient safety and comfort.<sup>13, 14</sup>

Table 2: Comparison of anxiety among study participants before, during, and after local anesthesia administration for professional status and flow of practice.

	The anxiety of local anesthesia administration					
	Before (n=311)	p	During (n=261)	p	After (n=167)	p
<b>Level of professional development</b>						
• Student	177 (56.9%)	0.246	172 (65.9%)	<0.001	104 (62.2%)	<0.001
• House officer	63 (20.3%)		54 (20.6%)		20 (12.0%)	
• Demonstrator	71 (22.8%)		35 (13.4%)		43 (25.7%)	
<b>No. of patients dealt with daily</b>						
• 10-15	236 (75.9%)	<0.001	206 (78.9%)	<0.001	137 (82.0%)	<0.001
• 16-20	47 (15.1%)		46 (17.6%)		30 (18.0%)	
• 21-25	28 (9.0%)		9 (3.4%)		0 (0.0%)	

Figure 1: Presence of anxiety among study participants before, during, and after local anesthesia administration during the dental procedure

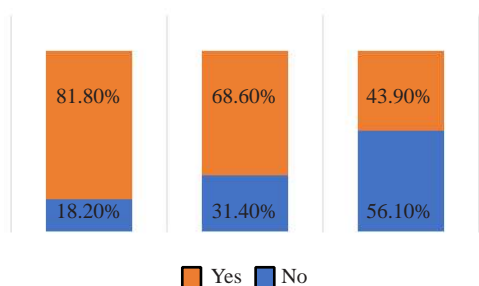
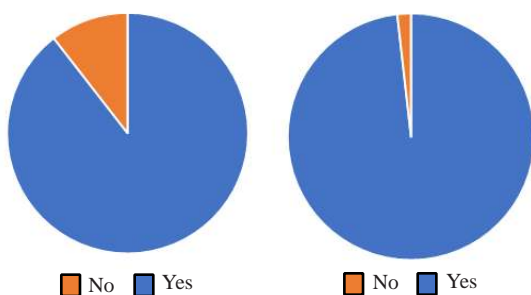


Figure 2: Response of study participants to: a). The usefulness of video demonstration of local anesthesia administration technique, b). The usefulness of hands-on patient demonstration of local anesthesia administration techniques



Wong et al evaluated the dental local anesthetic administration trial in student to student administration model. The later cohort was subjected to training and improvement was achieved after training was endorsed in terms of their anxiety and confidence level in giving their first injections to patients. The primary concern which was responsible for raised anxiety was fear of the patient’s pain and discomfort while giving the first infiltration of inferior alveolar nerve block injections. Major factors affecting the level of confidence were the age of patients and the type of local anesthetic injections.<sup>15</sup>

About 89% of the responders agreed for the usefulness of video demonstration while 98% agreed about usefulness of hands-on practice of local anesthesia administration technique.

Previous literature on the employment of teaching modalities such as visual techniques has deciphered promising results. Kenny et al evaluated used video clips of pediatrics local anesthetic administration in addition to theoretical training with seminars and lectures to assess the impact on the confidence of local anesthesia administration in 86 undergraduate dental students of the fourth year. The study group was divided into intervention groups receiving an intervention-based visual aid for local anesthetic administration. The intervention and control groups were provided a questionnaire for evaluation. A significant difference was endorsed in the confidence level of the two groups (p-value .003) and the impact of which remained up to 4 months (p-value .001).<sup>16</sup>

Wong G et al analyzed dental students’ clinical perspectives regarding the administration of dental local anesthetics. However, the student-to-student modality was most consistent but they introduced manikin simulation models to eradicate fear, possible complications, and ethical concerns. Study participants were divided into batches receiving practical experience of local anesthetic administration on either patients or manikin. Although results did not differ statistically between the two groups manikin simulation provided a safe clinical practice platform.<sup>17</sup>

Absolute local anesthesia and dental practice go hand in hand therefore it is mandatory to pave the way for absolute precision to prevent possible major and minor complications associated with the modality. Maximal comfort and analgesia are mandatory for the successful treatment hence vital for patient and practitioner.<sup>18</sup>

Brand et al enrolled sixty five students who were distributed in two groups one exposed to pre-clinical teaching model for local anesthesia administration whereas other group was not given such exposure. Endorsements made by recipients



in the questionnaire after on hands experience reported a significant difference between expertise of two groups concluding significance of pre-clinical teaching models.<sup>19</sup> To enhance expertise and confidence of students it is mandatory to teach and train faculty as well in particular student centered perceptions.<sup>20</sup>

This study had limitations of smaller sample size and short study duration. Additionally facilities of manikan simulation model wasn't available at the university to assess competence and develop confidence of students and young dental professionals.

### CONCLUSION:

Students were significantly more anxious during and after local anesthesia administration as compared to house officers and demonstrators, similarly, responders dealing with a lesser number of patients on daily basis were found to be more anxious before, during, and after local anesthesia injection administration. Video demonstration and hands-on practice are useful adjuvants in the reduction of local anesthesia administration anxiety, thus improving the technique.

#### Authors Contribution:

**Beenish Abbas:** Study conception, data analysis, drafting manuscript

**Sana Abbas:** Analyzing critically, drafting manuscript, proof reading

**Muhammad Umair:** Data analysis, final approval  
**Ramesha Azam:** Data collection, proof reading, final approval, revising critically

**Majida Rahim:** Logistic support, proof reading, data collection  
**Batool Zara:** Drafting manuscript

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