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Assessment of Dentists' Knowledge of Local Anesthetic Hypersensitivity

Serdar Göktaş

Mersin City Hospital, Clinic of Pediatric Immunology and Allergy, Mersin, Türkiye

ABSTRACT

This study evaluated dentists' knowledge, attitudes, and practices regarding local anesthetic allergy and anaphylaxis management.

In this cross-sectional survey, 87 dentists working in public institutions in the Van region completed a questionnaire assessing demographics, preferred local anesthetic agents, responses to hypersensitivity-related scenarios, and knowledge of anaphylaxis diagnosis and emergency management.

Most participants were aged 25–35 years (82.8%), and 49.4% had less than five years of professional experience. Articaine was the most preferred local anesthetic (41.4%). For suspected local anesthetic allergy, 51.7% of dentists referred patients to an allergist, while 21.8% avoided treatment. A total of 57.4% reported that their undergraduate education on this topic was insufficient, and 16.1% had received recent anaphylaxis training. Only 23.0% of dentists correctly identified the diagnostic criteria for anaphylaxis. Although 77.0% recognized adrenaline as the established first-line treatment, correct dosing knowledge was limited for both pediatric (34.5%) and adult patients (14.9%). Designated emergency protocols were unavailable in 85.0% of clinics, and no essential emergency medications were available in 52.9% of clinics.

Dentists' preparedness for managing local anesthetic-induced hypersensitivity reactions and anaphylaxis was insufficient.

Keywords: Anaphylaxis, dental education, local anesthetic

Introduction

Anaphylaxis is a severe and potentially fatal systemic hypersensitivity reaction triggered by foods, drugs, chemicals, or insect stings (1). Anaphylactic reactions to local anesthetics in dental practice are rare, with an estimated incidence of 0.0261 episodes per million local anesthetic cartridges used (1,2). Lidocaine is the most frequently implicated agent (1,2). True allergic responses to local anesthetics are uncommon and account for less than 1% of all adverse reactions. Among these, type I anaphylactic reactions represent the most severe presentations (3). Clinical manifestations may include difficulty breathing, dizziness or lightheadedness, wheezing, clammy skin, urticaria, angioedema, vomiting, hypotension, and tachycardia (4,5). Although infrequent, anaphylaxis associated with local anesthetics demands immediate recognition and rapid intramuscular epinephrine administration, as delays may worsen clinical outcomes (4,6,7).

In this context, the present study used a structured survey to evaluate dentists' knowledge of the symptoms, risk factors, and emergency management of local anesthetic-induced anaphylaxis. Identifying these knowledge gaps will support the development of targeted educational strategies and improve preparedness and patient safety in dental practice.

Materials and Methods

This cross-sectional study was conducted among dentists working in public institutions in a single region of eastern Turkey. Participants were identified from the official registry of actively practicing dentists, and those available during on-site visits to their workplaces were approached in person, informed about the study, and invited to participate. The study included dentists with varying levels of professional experience, ranging from newly graduated practitioners to mid-career and senior clinicians.

Data were collected through face-to-face administration of a structured questionnaire at the participants' workplaces. The survey comprised 21 items: three questions addressed demographic characteristics (age, gender, years of professional experience), and eighteen assessed knowledge related to local anesthetic allergy and anaphylaxis. These items evaluated dentists' ability to recognize

*Corresponding Author: Serdar Göktaş, Mersin City Hospital, Clinic of Pediatric Immunology and Allergy, Mersin, Türkiye
E-mail: drsrdr33@gmail.com, Phone: +90 505 496 9028
ORCID ID: Serdar Göktaş: 0000-0002-5738-4979
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anaphylaxis diagnostic criteria, identify the correct first-line treatment, and distinguish anaphylaxis from other adverse reactions. All questionnaires were completed anonymously, and there were no missing data. The questionnaire was developed by the author based on existing literature and expert opinion to ensure content validity.

The study protocol received approval from the institutional ethics committee (Approval No: GOKAEK/2025-02-22; Date: 28/02/2025) and was conducted in accordance with the Declaration of Helsinki.

Statistical Analysis: All statistical analyses were performed using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented as frequencies and percentages for categorical variables and as mean ± standard deviation (SD) or median (minimum–maximum) for continuous variables, depending on distribution characteristics assessed using the Shapiro–Wilk test. All analyses were conducted on complete cases.

The primary outcomes were the correct identification of anaphylaxis diagnostic criteria and the correct recognition of intramuscular adrenaline as the first-line treatment (both coded as correct/incorrect). Comparisons across gender, age groups, and professional experience were restricted to these two predefined primary outcomes because they represent the most clinically critical and objective indicators of anaphylaxis-related knowledge in dental practice. Independent variables included gender (female/male), age group (25–35, 36–50, ≥50 years), and professional experience (<5, 6–10, ≥10 years).

Associations between categorical variables were assessed using Pearson's chi-square test, with Fisher's Exact Test applied when more than 20% of expected cell counts were below five. For ordinal predictors such as age group and years of experience, linear-by-linear association tests were used to evaluate potential dose–response trends. Effect sizes (Phi, Cramer's V, and Spearman's rank correlation coefficients) were calculated to characterize the strength and direction of observed associations. A two-sided p-value < 0.05 was considered statistically significant.

Results

A total of 87 dentists participated in the study. Most were aged 25–35 years (82.8%), followed by 36–50 years (14.9%) and ≥50 years (2.3%). Gender distribution was nearly equal (51.7% male, 48.3% female). Nearly half of the participants had <5 years of professional experience (49.4%), while 36.8% had 6–10 years and 13.8% had >10 years (Table 1).

Regarding routine clinical practice, 96.6% reported consistently asking about drug allergies before treatment. Articaine was the most frequently preferred local anesthetic (41.4%), followed by the use of either articaine or lidocaine (23.0%) and lidocaine alone (11.5%), whereas prilocaine and mepivacaine were used less frequently. In total, 48 participants used a single anesthetic agent, 30 used two, 8 used three, and 1 reported using four agents. For suspected anesthetic allergies, 51.7% preferred referral to an allergist, 21.8% avoided the procedure, and 17.2% selected an alternative anesthetic agent; smaller proportions used lower doses or test dosing (3.4%), whereas 2.2% proceeded without an anesthetic.

Training and preparedness indicators were suboptimal. A total of 57.4% of participants considered their undergraduate training on anesthetic allergy and anaphylaxis to be inadequate. Furthermore, 16.1% had received anaphylaxis training within the past five years, and 92.9% found this training beneficial. In cases without known anesthetic allergy, 66.6% recommended allergist referral for patients with other allergic conditions. For mild reactions, 81.6% preferred referral, while 18.4% opted for an alternative anesthetic; none reused the same agent.

Knowledge of anaphylaxis was limited. Only 23% correctly identified all diagnostic criteria. Although 81.6% had never encountered anaphylaxis during anesthetic administration, 77% correctly identified intramuscular adrenaline as the first-line treatment, whereas 19.5% selected antihistamines and 3.5% corticosteroids. Emergency preparedness was low: 52.9% reported having none of the listed emergency medications in their clinic. Adrenaline alone was present in 24.1%, adrenaline plus antihistamines in 11.5%, all three medications (adrenaline, antihistamines, corticosteroids) in 11.5%, and antihistamines alone in 1.1%. The intramuscular route was preferred by 61% for adrenaline administration, while 19.5% selected the subcutaneous and 19.5% the intravenous route. Correct knowledge of adrenaline dosing was identified in 34.5% for a 30-kg child and 14.9% for a 60-kg adult. Only 15% reported having a clinic-specific emergency protocol (Table 2, Figure 1).

Gender was not associated with diagnostic accuracy for either anaphylaxis criteria or identification of intramuscular adrenaline as the first-line treatment, with comparable correct-response rates between females and males ($\chi^2(1) =$

Table 1: Descriptive Characteristics of The Participating Dentists

Variable	*n*	%	Mean ± SD
Age group			
25–35 years	72	82.8	29.99 ± 3.02
36–50 years	13	14.9	45.46 ± 4.23
≥50 years	2	2.3	60.00 ± 7.07
Gender			
Female	42	48.3	–
Male	45	51.7	–
Professional experience			
<5 years	43	49.4	–
6–10 years	32	36.8	–
>10 years	12	13.8	–

* Values are presented as frequencies, percentages, and mean ± standard deviation (SD), where applicable

Table 2: Survey Questions and Dentists' Responses

1. What is your age group?	
25-35 years	82.8%
36-50 years	14.9%.
≥50 years	2.3%.
2. What is your gender?	
Female	48.3%
Male	51.7%
3. How many years have you practiced dentistry?	
≤ 5 years	49.4%
6-10 years	36.8%
≥10 years	13.8%
4. Do you ask your patients about drug allergies before treatment?	
Yes	96.6%
No	3.4%

5. Please indicate the local anesthetics you use in your daily practice (You may select more than one option): Lidocaine Articaine Prilocaine Mepivacaine Other (Please specify):	Articaine: 41.4% Articaine/Lidocaine: 23.0% Only Lidocaine: 11.5% Lidocaine/articaine/prilocaine: 8.05% Lidocaine/prilocaine: 5.75% Lidocaine/mepivacaine: 3.4% Articaine/prilocaine: 2.3% Prilocaine: 1.15% Lidocaine/articaine/mepivacaine: 1.15% Lidocaine/articaine/mepivacaine/prilocaine:1.15% Mepivacaine: 1.15%
6. How would you proceed if you suspect a patient has a local anesthetic allergy?	
I do not perform the treatment.	21.8%
I treat patients without local anesthetic.	2.2%
I administer a lower dose of local anesthetic.	3.4%
I use an alternative local anesthetic.	17.2%
I personally administered a subcutaneous test dose of the suspected drug.	3.4%
I refer the patient to an allergist.	51.7%
7. Do you believe that you received sufficient education on local anesthetic allergies and anaphylaxis during your dental education?	
Yes	42.6%
No	57.4%
8. Have you attended any recent anaphylaxis training in the last five years?	
Yes	16.1%
No	83.9%
9.Do you think the training you attended was sufficient? (For those who attended the training)	
Yes	7.1%
No	92.9%

10. How do you approach a patient with no known history of local anesthetic allergy but other allergic conditions such as food allergy, atopic dermatitis, asthma, or allergic rhinitis?	
Without considering their other allergies, I proceed with the treatment.	33.4%
Due to a risk factor, I advise the patient to consult a pediatric allergist before treating.	66.6%
11. If one of your patients has previously developed a mild allergic reaction to a local anesthetic, how would you manage their next treatment?	
I use the same local anesthetic again.	0%
I choose a different local anesthetic.	18.4%
I refer the patient to an allergist.	81.6%
12. Which of the following are diagnostic criteria for anaphylaxis?	Correct answer rate: 23%
(Please check all applicable criteria.)	
Skin or mucosal symptoms:	
Generalized urticaria, pruritus, erythema	
Swelling of the lips, tongue, or uvula	
Respiratory symptoms:	
Respiratory distress, wheezing	
Bronchospasm, stridor	
Reduced PEF and hypoxemia	
Circulatory symptoms:	
Hypotension, collapse	
Syncope, incontinence	
Gastrointestinal symptoms:	
Abdominal cramps	
Recurrent vomiting	
Symptoms following exposure to a known allergen:	
Acute hypotension	
Bronchospasm	
Laryngeal involvement (stridor, voice changes, odynophagia)	
13. Have you ever had a patient experience systemic side effects during local anesthetic treatment?	
Yes	81.6%
No	18.4%
14. What is the first-line drug for anaphylaxis management?	
Adrenaline	77%
Antihistamine	19.5%
Corticosteroid	3.5%
Glucagon	0%
Salbutamol	0%

15. Which of the following medications are available in your clinic?	None of the emergency medications available: 52.9%
Adrenaline	Adrenaline alone: 24.1%
Antihistamine	Both adrenaline and antihistamines: 11.5%
Corticosteroid	Adrenaline, antihistamines, and corticosteroids: 11.5%
Glucagon	Both adrenaline and corticosteroids: 1.1%
Salbutamol	Antihistamines alone:1.1%
16. What is your preferred route of administration for adrenaline injections?	
Intramuscular (IM)	61%
Subcutaneous (SC)	19.5%
Intravenous (IV)	19.5%
17. What is the correct adrenaline dose for a 30 kg child?	Correct answer: 34.5%
18. What is the correct adrenaline dose for a 60 kg adult?	Correct answer: 14.9%
19. Does your clinic have a designated emergency anaphylaxis protocol?	
Yes	15%
No	85%
20. Have you had any practical experience managing anaphylaxis? (e.g., simulation training, clinical cases, etc.)	
Yes	4.6%
No	95.4%
21. Would you be interested in training on anaphylaxis management?	
Yes	4.8%
No	95.2%

*Values are presented as percentages of total respondents

0.47, p = 0.493; $\chi^2(1) = 0.71$, p = 0.399) (Tables 3–4).

Because of low expected cell counts, Fisher's exact test was applied for group comparisons. Age group was significantly associated with accurate identification of anaphylaxis diagnostic criteria, as shown by the chi-square analysis ($\chi^2(2) = 8.58$, p = 0.014) and confirmed by Fisher's exact test (p = 0.016). Correct identification rates were highest among dentists aged 36–50 years, with lower rates observed in the other age groups (Table 5). In contrast, age group was not associated with correct identification of first-line anaphylaxis treatment, based on both the chi-square analysis ($\chi^2(2) = 1.27$, p = 0.530) and Fisher's exact test (p = 0.478) (Table 6).

Professional experience was significantly associated with accurate identification of anaphylaxis diagnostic criteria, as demonstrated by the chi-square analysis ($\chi^2(2) = 6.73$, p = 0.035) and supported by Fisher's exact test (p = 0.023) (Table 7). In addition, a weak but statistically significant positive correlation was observed between professional experience and correct identification of anaphylaxis diagnostic criteria (Spearman's $\rho = 0.278$, p = 0.009). Conversely, no statistically significant association was observed between professional experience and correct identification of adrenaline as the first-line treatment for anaphylaxis, based on the chi-square analysis ($\chi^2(2) = 3.29$, p = 0.193) and Fisher's exact test (p = 0.197) (Table 8).

Discussion

Local anesthetic allergies and anaphylaxis are rare but potentially life-threatening conditions requiring prompt recognition and intervention. This study evaluated dentists' awareness and clinical preparedness regarding these reactions, driven by the

Table 3: Association Between Gender and Correct Identification of Anaphylaxis Diagnostic Criteria

Gender	Incorrect n (%)	Correct n (%)	Total n (%)	χ^2 (1)	p
Female	31 (73.8%)	11 (26.2%)	42 (100%)	0.47 (1)	0.493
Male	36 (80.0%)	9 (20.0%)	45 (100%)		

*A chi-square test was used to assess the association between gender and correct identification of anaphylaxis diagnostic criteria

Table 4: Association Between Gender and Correct Identification of First-Line Anaphylaxis Treatment Among Dentists

Gender	Incorrect n (%)	Correct n (%)	Total n (%)	χ^2 (1)	p
Female	8 (19.0%)	34 (81.0%)	42 (100%)	0.71 (1)	0.399
Male	12 (26.7%)	33 (73.3%)	45 (100%)		

*A chi-square test was used to assess the association between gender and correct identification of first-line anaphylaxis treatment

Table 5: Association Between Age Groups and Accurate Identification of Anaphylaxis Diagnostic Criteria

Age group	Incorrect n (%)	Correct n (%)	Total n (%)	p
25–35 years	59 (82.0%)	13 (18.0%)	72 (100%)	
36–50 years	6 (46.2%)	7 (53.8%)	13 (100%)	0.016
≥50 years	2 (100%)	0 (0%)	2 (100%)	

* Fisher's exact test was used due to low expected cell counts.

Table 6: Association Between Age Group and Correct Identification of First-Line Anaphylaxis Treatment

Age group	Incorrect n (%)	Correct n (%)	Total n (%)	p
25–35	17 (23.6%)	55 (76.4%)	72 (100%)	
36–50	2 (15.4%)	11 (84.6%)	13 (100%)	0.478
≥50	1 (50.0%)	1 (50.0%)	2 (100%)	

* Fisher's exact test was used due to low expected cell counts

Table 7: Association Between Professional Experience and Accurate Identification of The Anaphylaxis Diagnostic Criteria Among Dentists

Professional experience	Incorrect n (%)	Correct n (%)	Total n (%)	p
<5 years	38 (88.4%)	5 (11.6%)	43 (100%)	
6–10 years	22 (68.8%)	10 (31.3%)	32 (100%)	0.023
≥10 years	7 (58.3%)	5 (41.7%)	12 (100%)	

* Fisher's exact test was used due to low expected cell counts

Table 8: Association Between Professional Experience and Correct Identification of Adrenaline As The First-Line Treatment İn Anaphylaxis Among Dentists

Professional experience	Incorrect n (%)	Correct n (%)	Total n (%)	p
<5 years	13 (30.2%)	30 (69.8%)	43 (100%)	
6–10 years	4 (12.5%)	28 (87.5%)	32 (100%)	0.197
≥10 years	3 (25.0%)	9 (75.0%)	12 (100%)	

* Fisher's exact test was used due to low expected cell counts

hypothesis that knowledge gaps may compromise patient safety.

Most participants (82.8%) were aged 25–35 years, while dentists aged ≥50 years were markedly underrepresented (2.3%). This demographic pattern likely reflects the regional workforce distribution and may have influenced knowledge levels traditionally strengthened through long-term clinical experience. The near-equal distribution of male and female participants supports a balanced assessment of anaphylaxis-related knowledge without substantial gender-related bias.

Routine inquiry about drug allergies was reported by 96.6% of participants, demonstrating general awareness of hypersensitivity risks. However, even a small proportion failing to obtain this history represents a meaningful gap, as previous reactions remain the strongest predictor of future hypersensitivity and guide clinical decision-making (8). Conversely, inaccurate allergy labels may unnecessarily restrict first-line therapies and contribute to inappropriate substitutions (9,10).

Local anesthetic preference varied, with articaine emerging as the most commonly selected agent (41.4%). This finding differs from global trends where lidocaine historically predominates, though articaine is increasingly preferred in several countries, including Germany (11,12). The limited use of prilocaine and mepivacaine suggests targeted selection driven by pharmacokinetic properties, procedural needs, and clinician familiarity (13). Such reliance on a narrow group of familiar agents may promote procedural consistency but may also contribute to hesitancy when managing unexpected reactions.

Management approaches to suspected local anesthetic allergies varied substantially. While more than half of the participants (51.7%) referred such patients to specialists, a sizeable proportion elected to avoid treatment entirely or adopted alternative strategies such as switching agents or administering test doses. Only 2.2% would proceed without anesthesia, a practice that may compromise patient comfort. These findings highlight the uncertainty dentists face when confronted with potential hypersensitivity and how this uncertainty shapes clinical decision-making.

More than half of the participants (57.4%) rated their undergraduate or postgraduate education on anesthetic allergy and anaphylaxis as insufficient, and most (83.9%) had not received recent anaphylaxis training. These results align with prior studies demonstrating gaps in dental curricula related to hypersensitivity and emergency preparedness (14–16). Among those who had received training within the past five years, nearly all (92.9%) found it beneficial, indicating strong receptiveness to educational interventions.

Dentists exhibited cautious approaches to patients with coexisting allergic conditions, with 66.6% preferring referral to an allergist before administering local anesthesia. In contrast, 33.4% chose to proceed without further evaluation, reflecting practice variability. In such patients—including pediatric cases—adequate pain control and behavioral support remain essential (17). For mild suspected reactions to local anesthetics, most dentists (81.6%) favored referral rather than re-exposure, consistent with literature reporting reluctance to proceed without specialist input (18,19).

A major concern is the limited recognition of anaphylaxis, with only 23% of participants correctly identifying all diagnostic criteria. This aligns with existing reports demonstrating significant difficulty among healthcare providers in recognizing anaphylaxis (7,20). Given that rapid diagnosis and prompt intramuscular epinephrine administration are the primary determinants of survival (21), these findings underscore the need for improved education. Although most respondents had never encountered anaphylaxis after anesthetic administration, published estimates indicate that anesthesia-related anaphylaxis occurs in approximately 1 in 3,500 to 1 in 13,000 cases (22). Furthermore, neuromuscular blocking agents, latex, and antibiotics remain common triggers in operative settings (23), emphasizing the importance of broad-based preparedness.

In parallel with these findings, 77% of dentists correctly identified adrenaline as the first-line medication for anaphylaxis. However, substantial misconceptions persisted, consistent with global data indicating that correct identification of adrenaline does not necessarily equate to comprehensive competence in anaphylaxis management. Similar gaps between theoretical knowledge and practical readiness have been reported in previous studies (7,24).

Emergency preparedness indicators were concerning. More than half of the clinics lacked essential medications (52.9%), nearly 40% selected incorrect administration routes for adrenaline, and only 15% had a clinic-specific emergency protocol. Moreover, 95.4% reported no hands-on experience with anaphylaxis, although nearly all (95.2%) were willing to receive training. These findings highlight opportunities for developing structured emergency readiness programs within dental practice.

Subgroup analyses revealed that gender was not associated with diagnostic accuracy, indicating that knowledge gaps extend across demographic groups. Dentists aged 36–50 years demonstrated better

recognition of anaphylaxis diagnostic criteria, while professional experience also showed a positive association with diagnostic accuracy. However, neither age nor experience improved correct identification of the first-line treatment route. These findings suggest that while clinical exposure enhances certain competencies, it does not uniformly translate to complete mastery of anaphylaxis management.

This study has several limitations. Its single-region design limits generalizability, and the use of a convenience sampling approach—recruiting only dentists available during onsite visits—may have introduced selection bias. The marked underrepresentation of dentists aged ≥50 years, represented by only two participants, restricts interpretation of age-related subgroup analyses. As the questionnaire relied on self-reported information, recall and social desirability biases are possible. Although the survey was developed based on existing literature and expert opinion to ensure content validity, formal psychometric validation was not performed. Additionally, the study assessed knowledge rather than practical skills; therefore, the findings may not fully reflect real-time clinical performance during anaphylaxis. Emergency preparedness data were based solely on participant reporting and were not objectively verified. Non-response bias cannot be excluded. These limitations should be considered when interpreting the results.

Despite these limitations, this study provides valuable insight into dentists' preparedness for managing local anesthetic-induced anaphylaxis—a topic for which current data remain limited. By identifying critical knowledge gaps and patterns of clinical decision-making, the study offers an important foundation for developing targeted educational strategies aimed at improving patient safety.

Future research should include larger, multicenter samples and evaluate the long-term impact of structured anaphylaxis training programs to enhance sustainable emergency competence in dental practice.

In conclusion, this study demonstrated that despite increasing awareness of hypersensitivity risks, significant deficiencies persist in recognizing and managing local anesthetic allergies and anaphylaxis among dental practitioners. These findings underscore the need to strengthen dental curricula and promote ongoing professional training focused on emergency management of life-threatening reactions.

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References

1. Hascoët E, Mahé J, Meillard H, Théophile H, Cloitre A, Lesclous P. Anaphylactic reactions to local anesthetics in dental practice: a nationwide French retrospective study Clin Oral Investig. 2022;26(2):1667-76.
2. Chiu CY, Lin TY, Hsia SH, Lai SH, Wong KS. Systemic Anaphylaxis Following Local Lidocaine Administration during a Dental Procedure. Pediatr Emerg Care. 2004;20(3):178-80.
3. Speca SJ, Boynes SG, Cuddy MA. Allergic Reactions to Local Anesthetic Formulations. Dent Clin North Am.2010 Oct;54(4):655-64.
4. Maqbool S, Ali SMAH, Niaz H, Akbar SMA, Siddique S, Shami S. Knowledge and Attitude towards Anaphylaxis Reaction by Local Anesthesia among Dental Practitioners. Pak J Med Health Sci. Vol. 17 No. 02 (2023):562-5.
5. Cardona V, Ansotegui IJ, Ebisawa M, et al. World allergy organization anaphylaxis guidance 2020. World Allergy Organ J. 2020 Oct 30;13(10):100472.
6. Jevon P, Shamsi S. Management of anaphylaxis in the dental practice: an update. Br Dent J. 2020 Dec;229(11):721-8.
7. Ozkars MY, Yurttutan S. Drug allergy and anaphylaxis in dentistry. Asthma Allergy Immunology. 2020;18(3).
8. Brockow K, Aberer W, Atanaskovic-Markovic M, et al. Drug allergy passport and other documentation for patients with drug hypersensitivity-An ENDA/EAACI Drug Allergy Interest Group Position Paper. Allergy. 2016 Nov;71(11):1533-9.
9. MacPherson RD, Willcox C, Chow C, Wang A. Anaesthetist's responses to patients' self-reported drug allergies. Br J Anaesth. 2006 Nov;97(5):634-9.
10. Thomas C, Clark S, Fallaha D, et al. DALES, Drug Allergy Labels in Elective Surgical patients: a prospective, multicentre cross-sectional study of prevalence, nature and anaesthetists' approach to management. Br J Anaesth.2021 Dec;127(6):897-904.
11. Alanazi FS, Alhazzaa MF, Alosaimi YM, et al. Preference of dental practitioners toward the use of local and topical anesthetics for pediatric patients in saudi arabia: A cross-sectional survey. Children (Basel). 2021 Oct 28;8(11):978.
12. Halling F, Neff A, Ziebart T. Local Anesthetic Usage among Dentists: German and International Data. Anesth Prog. 2021 Mar 1;68(1):19-25.
13. Shah J, Votta-Velis EG, Borgeat A. New local anesthetics. Best Pract Res Clin Anaesthesiol. 2018 Jun;32(2):179-85.

14. He K, Breitman L, Lee J, Van Doren E, Li A, Donoff RB. How US dental schools can better prepare their students to perform operative procedures. J Dent Educ. 2021 Apr;85(4):531-8.
15. Hashim R, Mathew L, Rustom S, Amer F, Odeh R. Emergency medical care in dentistry: A cross sectional analysis of competencies for undergraduate students. Int J Crit Illn Inj Sci. 2021 Jan-Mar;11(1):33-8.
16. Arsati F, Montalli VÂ, Flório FM, et al. Brazilian Dentists' Attitudes About Medical Emergencies During Dental Treatment. J Dent Educ.2010 Jun;74(6):661-6.
17. Custódio NB, Cademartori MG, Azevedo MS, et al. Efficacy of audiovisual distraction using eyeglasses during dental care: A randomized clinical trial. Braz Oral Res. 2021 Feb 12:35:e26.
18. Ramsey A, Brodine AH. Allergy topics for dental practitioners. Gen Dent. 2019 Jul-Aug;67(4):38-45.
19. Papakonstantinou E, Raap U. Oral Cavity and Allergy: Meeting the Diagnostic and Therapeutic Challenge. Current Oral Health Reports. December 2016 Vol. 3(4):347-55.
20. Krishnamurthy M, Venugopal NK, Leburu A, Kasiswamy Elangovan S, Nehrudhas P. Knowledge and attitude toward anaphylaxis during local anesthesia among dental practitioners in Chennai - A cross-sectional study. Clin Cosmet Investig Dent.2018 Jun 28:10:117-21.
21. Yablowitz MG, Dölle S, Schwartz DG, Worm M. Proximity-based emergency response communities for patients with allergies who are at risk of anaphylaxis: Clustering analysis and scenario-based survey study. JMIR Mhealth Uhealth.2019 Aug 22;7(8):e13414.
22. Linton E, Watson D. Recognition, assessment and management of anaphylaxis. Nurs Stand.2010 Jul;24(46):35-9.
23. P M Mertes, K Tajima, M A Regnier-Kimmoun, et al. Perioperative Anaphylaxis. Med Clin North Am.2010 Jul;94(4):761-89.
24. Ptaszynski P, Raczynski A, Aluchna M, Aluchna A, Smereka J. The knowledge of and attitudes toward anaphylaxis emergency management among Polish dentists. Disaster and Emergency Medicine Journal. 2018;3(4):125-30.