Dentistry 3000

Vol 13, No 1 (2025)
ISSN 2167-8677 (online)
DOI 10.5195/d3000/2025.943

Gaps in Medical Emergency Preparedness Among Iraqi Dentists: A Nationwide Cross-Sectional Analysis

Awf Sh. Mahmood[1], Meena Muneeb[2]

[1]*College of Dentistry, Al-Iraqia University, Baghdad, Iraq*

[2]*Dijlah University College, Baghdad, Iraq*

Abstract

Objective: To evaluate the preparedness of Iraqi dental practitioners in managing medical emergencies by assessing self-reported confidence, theoretical knowledge, prior clinical exposure, and formal training in Basic Life Support (BLS) and emergency management protocols. **Material and Methods**: A nationwide cross-sectional study was conducted from November 2024 to March 2025 using a validated, self-administered electronic questionnaire distributed to licensed Iraqi dentists. The survey assessed demographic characteristics, knowledge of emergency protocols, prior exposure to emergencies, and participation in BLS or related training. Data were analyzed using SPSS version 22 to explore associations between preparedness and professional or demographic variables. **Results**: A total of 531 dentists participated; 58.9% were female, and 86% were general practitioners. Only 47.2% reported confidence in managing medical emergencies. Furthermore, 86.4% demonstrated moderate to low knowledge, and most had limited clinical exposure. Formal BLS/CPR training was reported by 35.2%, and 31.7% had attended structured emergency management courses. Prior training was significantly associated with greater confidence and preparedness ($p < 0.05$). **Conclusion**: Substantial deficiencies were identified in the emergency preparedness of Iraqi dentists, particularly in clinical exposure and formal training. These findings highlight the urgent need to incorporate mandatory BLS certification, simulation-based instruction, and continuous professional development into dental education and licensure frameworks, aligning national practice with international standards and enhancing patient safety.

Open Access

Citation: Mahmood AS, et al. (2025) Gaps in Medical Emergency Preparedness Among Iraqi Dentists: A Nationwide Cross-Sectional Analysis. Dentistry 3000. 1:a001 doi:10.5195/d3000.2025.943
Received: May 16, 2025
Accepted: July 6, 2025
Published: August 11, 2025

Email: Awf.sh.mahmood@aliraqia.edu.iq

Introduction

Although medical emergencies are relatively rare in dental settings, their occurrence can be life-threatening and demand immediate, competent intervention. Beyond performing routine procedures, dental practitioners are responsible for recognizing and managing acute medical events that may arise due to patients' underlying systemic conditions, anxiety, procedural stress, or adverse drug interactions [1-3].

Common emergencies encountered in dental clinics include vasovagal syncope, angina, hypoglycemia, seizures, airway obstruction, asthma exacerbations, anaphylaxis, and, in severe cases, cardiac arrest [4-6]. With the growing prevalence of chronic diseases, the likelihood of encountering such scenarios is increasing, underscoring the need for preparedness to mitigate preventable morbidity, mortality, and medicolegal consequences.

Despite the existence of international guidelines emphasizing the importance of emergency readiness, evidence suggests that many dental practitioners lack adequate training in medical emergency management [1,7]. Competence in this area requires formal instruction in Basic Life Support (BLS), Advanced Cardiovascular Life Support (ACLS), familiarity with emergency pharmacology, and proficiency in the use of emergency equipment. Nevertheless, global studies continue to reveal deficiencies in preparedness, often attributed to limited training opportunities, insufficient regulatory mandates, and variability in emergency protocols across clinical settings [8-10]. Furthermore, many dental professionals report low confidence in managing emergencies, reflecting a discrepancy between theoretical knowledge and clinical performance [11].

Compounding this issue, the availability of emergency medications and essential equipment in dental clinics is frequently inadequate, particularly in private practice settings. Such deficiencies can delay life-saving interventions, especially in cases where

Vol 13, No 1 (2025) DOI 10.5195/d3000/2025.943

emergency medical services are delayed or unavailable [6,12].

In Iraq, despite the critical nature of this issue, there is a notable lack of data on dental practitioners' preparedness for medical emergencies. As such, this study aims to evaluate the knowledge, confidence, prior exposure, and training of Iraqi dentists regarding emergency management. By identifying existing gaps, this research seeks to provide an evidence-based foundation for educational reform and policy development within a developing healthcare system.

Material and Methods

Study Design

This descriptive cross-sectional study was conducted between December 2024 and March 2025 to assess the preparedness of Iraqi dental practitioners in managing medical emergencies. The study adhered to the STROBE guidelines for cross-sectional research.

Survey Design & Development of Questionnaire

A structured, self-developed questionnaire was designed by the authors based on a comprehensive review of the literature on emergency management in dental settings. Content validity was established through evaluation by five independent experts in oral and maxillofacial surgery and oral medicine, who assessed each item for clarity, relevance, and completeness. A pilot study involving 30 licensed practicing dentists was conducted to evaluate validity and internal consistency, with refinements made accordingly before final distribution.

The final questionnaire consisted of three core domains:

1. **Demographic and professional profile**, including gender, academic qualification, specialty, and years of clinical experience.

2. **Knowledge assessment**, comprising 14 multiple-choice items focused on emergency recognition, pharmacologic protocols, and clinical response. Each correct response was awarded one point. Total knowledge scores were categorized as high (11–14), moderate (7–10), or low (0–6).

3. **Training and preparedness**, capturing self-reported confidence in handling medical emergencies, prior exposure to such events, and previous participation in Basic Life Support (BLS), Cardiopulmonary Resuscitation (CPR), and Advanced Cardiovascular Life Support (ACLS) training courses.

The complete questionnaire is available in Table 1 to support transparency and reproducibility.

Data Collection

The questionnaire was distributed electronically through official mailing lists of dental associations, academic platforms, and professional social media groups. Eligible participants were licensed Iraqi general dentists and dental specialists actively engaged in clinical practice. Dental students and non-practicing individuals were excluded to ensure the accuracy and relevance of the sample. A convenience sampling approach was used.

Sample Size Determination

The required sample size was calculated using Slovin's formula, assuming a target population of 19,000 Iraqi dentists, a 95% confidence level, and a 5% margin of error. The minimum calculated sample was 392. A total of 531 valid responses were collected, exceeding the requirement and enhancing the generalizability of the results.

Ethical Considerations

Ethical approval was obtained from the Faculty of Dentistry, Dijlah University (Ref No.29 on 16 October 2024). All participants were informed of the voluntary and anonymous nature of the study, and electronic informed consent was obtained prior to participation and completion of the survey.

Statical Analysis

Data was analyzed using SPSS version 25 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including frequencies and percentages, were used to summarize categorical and continuous variables. Inferential statistics were applied to examine associations between knowledge levels and participant characteristics. Pearson chi-square tests and post hoc analyses were used to evaluate group differences. The contingency coefficient (C.C.) was calculated to determine the strength of associations among categorical variables. A p-value of 0.05 or less was considered statistically significant, and outcomes were classified as non-significant, significant, or highly significant. No subgroup or sensitivity analyses were conducted beyond the descriptive and comparative statistics reported, as the primary objective was to assess preparedness levels and associated factors within the overall study sample consistent with the cross-sectional design.

Results

A total of 531 licensed dental practitioners from across Iraq participated in this study. Of these, 313 (58.9%) were female and 218 (41.1%) were male. Most respondents (81.7%) reported less than five years of clinical experience, while 7.7% had practiced for 5–10 years, 4.9% for 11–19 years, and 5.6% for 20 years or more. Regarding qualifications, general practitioners represented 86% of the sample (n = 457), while specialists comprised 14% (n = 74). The sociodemographic characteristics of the participants are summarized in Table 2.

Emergency preparedness is detailed in Table 3. Notably, 47.3% of respondents (n = 251) reported confidence in managing medical emergencies, whereas 52.7% (n = 280) did not; this difference was not statistically significant (P = 0.557). A history of encountering a medical emergency was reported by 45.0% (n = 239), compared to 55.0% (n = 292) who had not (P = 0.275). In contrast, only 35.2% (n = 187) had received formal Basic Life Support (BLS) or Cardiopulmonary Resuscitation (CPR) training, a statistically significant difference compared to the 64.8% (n = 344) who had not (P = 0.001). Furthermore, 31.7% of participants (n = 168) attended structured emergency management courses, while 68.3% (n = 363) had not—a highly significant finding (P < 0.001).

Knowledge was assessed using a 14-point scale covering core emergency management concepts. Overall, 13.3% of respondents demonstrated high knowledge (mean score: 11.79), 47.1% had moderate knowledge (mean score: 8.55), and 39.4% exhibited low knowledge (mean score: 4.63), as demonstrated in Table 4.

Statistical analysis revealed several significant associations. Emergency exposure was significantly associated with gender [Correlation Coefficient (CC) = 0.179, P = 0.03] and professional qualification (CC = 0.239, P = 0.013). Confidence in managing emergencies was strongly associated with prior exposure (CC = 0.242, P = 0.003) and significantly related to attendance at emergency management courses (CC = 0.201, P = 0.014). Prior exposure to emergencies was also highly associated with having received BLS training (CC = 0.270, P = 0.001) and with participation in emergency courses (CC = 0.256, P = 0.002). These correlations are detailed in Table 5.

Discussion

This study reveals significant deficiencies in the medical emergency preparedness of Iraqi dental practitioners in terms of clinical

Vol 13, No 1 (2025) DOI 10.5195/d3000/2025.943

exposure, confidence, and formal training. Only 47.2% of respondents reported confidence in managing medical emergencies. This alarming figure aligns with international literature that links limited practical exposure and inadequate training to diminished self-efficacy in emergency response. These findings highlight a compelling need to integrate structured, simulation-based emergency training within both undergraduate and postgraduate dental education in Iraq to ensure baseline competence and enhance clinical responsiveness.

The lack of clinical exposure emerged as a significant concern, with 55% of participants indicating they had never encountered a medical emergency in practice. Additionally, only 35.2% had received formal Basic Life Support (BLS) or Cardiopulmonary Resuscitation (CPR) training, and just 31.7% had attended structured emergency management courses—both statistically significant gaps ($P = 0.001$ and $P < 0.001$, respectively). These deficiencies directly threaten patient safety and hinder effective emergency management. Prior research, including those by Wu et al. and Manton et al, has consistently demonstrated that repeated exposure to simulation-based scenarios significantly enhances readiness and decision-making in acute clinical situations. [13,14]. Similarly, Anwar et al. emphasized the importance of systematic, curriculum-based emergency instruction in bridging the knowledge-practice gap among dental professionals [15].

Comparable inadequacies have been documented in regional studies. A national survey by Alotaibi et al. on BLS certification rates among Saudi dentists, while Ilyas et al. and Tar Binti Midzi et al. found that the absence of formal emergency education in Malaysia and Saudi Arabia similarly compromised preparedness [16-18]. In contrast, regulatory frameworks in the United States and the United Kingdom mandate BLS/CPR certification for licensure, with periodic recertification ensuring sustained competency. Iraq currently lacks such regulatory enforcement, exacerbating the systemic vulnerability in emergency management. Substantial international evidence affirms that mandatory training and revalidation policies significantly improve preparedness and clinical outcomes [19].

Notably, years of clinical experience were not significantly associated with preparedness ($P > 0.05$), a finding consistent with Bhagat et al. [20]. This suggests that clinical tenure alone does not ensure competence reinforces the necessity of structured, recurrent training. However, male practitioners and dental specialists were significantly more likely to have encountered medical emergencies ($P = 0.030$ and $P = 0.013$, respectively), likely due to greater clinical exposure levels and practice environments. These patterns are consistent with observations by Varoni et al., who identified clinical settings and patient caseload as critical determinants of preparedness [21].

Further multivariate analysis revealed that confidence in managing emergencies was significantly associated with previous clinical exposure ($P = 0.003$), participation in emergency training courses ($P = 0.014$), and receipt of BLS/CPR instruction ($P = 0.002$). These associations confirm that structured training improves theoretical knowledge, practical confidence, and operational agility. Accordingly, integrating emergency preparedness training into continuing professional development (CPD) frameworks and licensure requirements is essential for a resilient and competent dental workforce.

The overall preparedness score in this study reflects a moderate to poor level of readiness, echoing findings from Jaber et al. and other regional studies. Given the well-documented decline in emergency skills, periodic re-evaluation and refresher training are imperative. Sustainable preparedness hinges on initial educational interventions and longitudinal reinforcement through validated assessments and mandatory workshops [6,22].

Conclusions

The findings reveal a substantial deficiency in medical emergency preparedness among Iraqi dental practitioners. Bridging the gap necessitates the urgent need for comprehensive, well-structured practical training programs. Incorporating mandatory BLS/CPR certification, simulation-based training, and continuous professional development (CPD) into dental education and licensure requirements is essential. These interventions will reinforce practitioner competence, enhance patient safety, and align emergency response protocols in Iraq with international standards of care.

Conflicts of Interest

The authors state that there are no conflicts of interest.

Financial Support

This research was not supported by any grants or external funding sources.

References

1. Fernandes AL, Malik JB, Ansari SR, Murali S, Thirupathii J. Knowledge, attitude, and practice of dentists in the management of medical emergencies in India: A cross-sectional study. *J Oral Biol Craniofac Res*. 2023 Nov;13(6):758–63.
2. Abraham S, Badgujar M, Nagmode P, Lokhande N. Common medical emergencies in dentistry: A review. *World J Adv Res Rev*. 2022;15(3):443–9.
3. Pius L, Brady N, Overby M, Zhu J, Ferraro N. Emergency protocol in the dental clinic: Assessing medical emergency training requirements and guidelines for dentists. *J Am Dent Assoc*. 2023 Apr;154(4):301–10.
4. Müller MP, Hänsel M, Stehr SN, Weber S, Koch T. A state-wide survey of medical emergency management in dental practices: Incidence of emergencies and training experience. *Emerg Med J*. 2008 May;25(5):296–300.
5. Reed KL. Basic management of medical emergencies: Recognizing a patient's distress. *J Am Dent Assoc*. 2010 May;141 Suppl 1:S20–4.
6. Choufani A, Moussallem M, Dib JB, Asmar MK, Yeretzian JS. Lebanese dentists' preparedness to deal with medical emergencies in their clinics: A national survey. *Int Dent J*. 2025 Feb;75(1):324–32.
7. Solanki C, Geisinger ML, Luepke PG, Al-Bitar K, Palomo L, Lee W, et al. Assessing readiness to manage medical emergencies among dental students at four dental schools. *J Dent Educ*. 2021 Sep;85(9):1462–70.
8. Cheng A, Magid DJ, Auerbach M, Bhanji F, Bigham BL, Blewer AL, et al. Part 6: Resuscitation education science: 2020 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation*. 2020 Oct 20;142(16 Suppl 2):S551–79.
9. Vaughan M, Park A, Sholapurkar A, Esterman A. Medical emergencies in dental practice–management requirements and international practitioner proficiency: A scoping review. *Aust Dent J*. 2018 Dec;63(4):455–66.
10. Cardoso MB, Brusca MI, Verdu SD, Jewtuchowicz V. Medical emergencies in the dental office: Challenges and solutions. *Odontol (Montevideo)*. 2023;(1):15.
11. Kishimoto N, Sanuki T, Liu Y, Tran SD, Seo K. Simulation training for medical emergencies of dental patients: A review of the dental literature. *Jpn Dent Sci Rev*. 2023 Dec;59:104–13.
12. Nemati S, Hamedani S. Emergency medications and equipment indispensable for dental offices and clinics in Iran. *J Dent (Shiraz)*. 2024 Dec;25(4):374.
13. Wu JH, Lin PC, Lee KT, Liu HL, Lu PY, Lee CY. Situational simulation teaching effectively improves dental students' non-operational clinical competency and objective structured clinical examination performance. *BMC Med Educ*. 2024 May 14;24(1):533.
14. Manton JW, Kennedy KS, Lipps JA, Pfeil SA, Cornelius BW. Medical emergency management in the dental office (MEMDO): A pilot study assessing a simulation-based training

curriculum for dentists. *Anesth Prog*. 2021 Jun 29;68(2):76.
15. Anwar MA, Rehman IU, Khalil F, Saeed T, Shakeel S, Arif K, Kushef H. Knowledge, skills, and perceived competency in handling medical emergencies among dental house officers and general dentists. *Pak J Health Sci*. 2024 Oct 31:158–63.
16. Alotaibi O, Alamri F, Almufleh L, Alsougi W. Basic life support: Knowledge and attitude among dental students and staff in the College of Dentistry, King Saud University. *Saudi J Dent Res*. 2016 Jan;7(1):51–6.
17. Ilyas M, ul MA, Saleem A, Shaikh G, Tariq A. Knowledge and attitude of dental professionals towards basic life support. *Saudi J Oral Dent Res*. 2020;5(6):291–4.
18. Tarmidzi NA, Ramii NB, Amran N, Norazmi HN, Arifin NS. Knowledge, attitude and perception of private dental practitioners towards medical emergencies in Klang Valley, Malaysia. *J Int Dent Med Res*. 2022 May;15(2):649–55.
19. Shivakumar S, Doddawad VG, Shetty SK, Shivanagappa M, Narayanaswamy CS, Shetty A, Bhat HK. Effectiveness of basic life support training course intervention among dental practitioners and students: An experimental study. *Natl J Maxillofac Surg*. 2024 Jan;15(1):87–92.
20. Bhagat T, Shrestha A, Agrawal SK, Gautam U, Mishal R. Medical emergencies preparedness in dental clinic among postgraduate residents in Nepal. *J Chitwan Med Coll*. 2024 Mar 30;14(1):14–9.
21. Jaber L, Al-Qarni F, Alsaati M, Al-Nefaiee M, Shetty AC, Shaban S, et al. Perspectives of dental practitioners regarding their readiness for medical emergencies: A study in Saudi Arabia. *Open Dent J*. 2021 Dec 31;15(1):72–8.
22. Varoni EM, Rigoni M, Lodi G, Sardella A, Muti P, Vitello A, et al. Medical emergencies in dental practice: A nationwide web-based survey of Italian dentists. *Heliyon*. 2023 Mar 1;9(3):e13910.

Table 1. The questionnaire of the study

Part (1): Sociodemographic Part					
Q1	Gender	□ Male	□ Female		
Q2	Years of Experience	□ Less than 5 years	□ 5–10 years	□ 10–19 years	□ More than 20 years
Q3	Qualification	□ General practitioner	□ Specialist		
Part (2): Knowledge-Based Assessment					
Q4	What is the most frequently encountered medical emergency in dental practice?	A. Syncope	B. Hypoglycemia	C. Allergic Reaction	D. Seizure
Q5	A 25-year-old asthmatic patient begins wheezing and has difficulty breathing during a dental procedure. What should be done initially?	A. Administer Oxygen	B. Administer an epinephrine IM injection	C. Administer albuterol	D. Call emergency medical assistance
Q6	A diabetic patient, during a dental procedure, feels sweaty, tired, disoriented, and has a headache. The condition is most likely:	A. Hyperglycemia	B. Hypoglycemia	C. Angina	D. Anaphylaxis
Q7	During a dental procedure, a young adult patient loses consciousness, followed by generalized tonic-clonic movements; after 2 minutes, the seizure subsides, but the patient remains unconscious. What is the next immediate step in managing this condition?	A. Administer 5 mg midazolam	B. Activate emergency medical services	C. Place the patient in a recovery position and maintain the airway	D. Monitor vital signs and wait for the patient to regain consciousness
Q8	An adult male patient feels dizzy and sweaty and experiences crushing pain radiating down the left arm, neck, and mandible, associated with nausea and vomiting. The condition is most likely:	A. Angina	B. Insulin shock	C. Asthmatic attack	D. Myocardial infarction
Q9	When do most medical emergencies occur in dental practice?	A. During treatment	B. Immediately after treatment	C. 2–3 hours after treatment	D. During or shortly after local anesthesia injection
Q10	What is the primary cause of syncope in the dental office?	A. Anxiety	B. Hypertension	C. Overexertion	D. Prolonged treatment
Q11	What is the immediate action when a patient experiences syncope during dental treatment?	A. Place the patient in the Trendelenburg position	B. Ask the patient to sit in an upright position	C. Recline the patient and give oral glucose	D. Place the patient on their side
Q12	A conscious adult patient complains of difficulty breathing and speaking, holding their neck with one hand. The probable diagnosis is:	A. Asthma – give albuterol	B. Angina – administer Oxygen	C. Aspiration of a foreign body – Heimlich maneuver	D. Respiratory arrest – back blows

Vol 13, No 1 (2025) DOI 10.5195/d3000/2025.943

Q13	A diabetic patient shows symptoms of rapid pulse and pale, cold, and clammy skin. What is the first line of treatment?	A. Oral glucose	B. Glucagon 1 mg injection	C. Sublingual nitroglycerine	D. Oxygen
Q14	A young adult patient suddenly becomes pale with a flushed face and develops shortness of breath and gasping. The best action is:	A. Epinephrine 1 mg/mL IM	B. GTN 400 micrograms	C. Salbutamol inhaler 100 micrograms	D. Dispersible aspirin 300 mg
Q15	A young adult patient suddenly becomes pale with a flushed face and develops shortness of breath and gasping. The best action is:	A. Epinephrine 1 mg/mL IM	B. GTN 400 micrograms	C. Salbutamol inhaler 100 micrograms	D. Dispersible aspirin 300 mg
Q16	What is the best position for a conscious patient who has developed a myocardial infarction, and which drug would you choose for such a condition?	A. Comfortable position and Aspirin	B. Supine position and Aspirin	C. Reclined position and Oxygen	D. Supine position and Oxygen
Q17	What is the best treatment for a patient who has crushing pain extending to the neck and jaw?	A. Aspirin	B. Sublingual glyceryl trinitrate	C. IV saline infusion	D. Insulin SC

Answer Key – Questions 4 to 17

4. A | 5. C | 6. B | 7. C | 8. D | 9. D | 10. A | 11. A | 12. C | 13. A | 14. A | 15. A | 16. A | 17. B

	Part (3): Training and Preparedness Assessment		
Q18	Do you feel confident in handling medical emergencies during dental procedures?	□ Yes	□ No
Q19	Have you ever encountered a medical emergency during a dental procedure?	□ Yes	□ No
Q20	Did you receive practical Basic Life Support (BLS) or cardiopulmonary resuscitation (CPR) training?	□ Yes	□ No
Q21	Have you attended any courses in the management of medical emergencies?	□ Yes	□ No

Table 2. Sociodemographic characteristics (SDC) of the participants.

SDC	Groups	No.	%
Gender	Male	218	41.1
	Female	313	58.9
Years of Experience	< 5 yrs.	434	81.7
	5 - 10 yrs.	41	7.7
	11 - 19 yrs.	26	4.9
	≥ 20 yrs.	30	5.6
Qualification	GP	457	86
	Specialists	74	14

Table 3. Confidence, exposure, and trainingrelated to medical emergency preparedness.

Questions	**Response**	**n**	**%**	***P*-value**
Confident in handling medical emergencies?	Yes	251	47.3%	0.557
	No	280	52.7%	
Have you encountered a medical emergency previously?	Yes	239	45.0%	0.275
	No	292	55.0%	
Have you received BLS/CPR training?	Yes	187	35.2%	0.001
	No	344	64.8%	
Have you attended emergency management courses?	Yes	168	31.7%	<0.001
	No	363	68.3%	

Table 4. Knowledge level stratification of participants based on a 14-point assessment scale.

Knowledge Score	**No. of Participants**	**% of Sample**	**Average Score**	**Minimum Score**
High Knowledge (11–14 points)	71	13.3	11.79	11
Moderate Knowledge (7–10 points)	251	47.1	8.55	7
Low Knowledge (0–6 points)	209	39.4	4.63	0

Note: Scores reflect participant responses on a 14-point knowledge assessment scale.

Table 5. Correlation analysis of exposure, confidence, training, gender, and professional qualification.

Variables Analyzed	**Correlation Coefficient (CC)**	***P*-value**
Gender and Emergency Exposure	0.179	0.03
Qualification and Emergency Exposure	0.239	0.013
Confidence and Prior Exposure	0.242	0.003
Confidence and Emergency Course Attendance	0.201	0.014
Encountered Emergency and BLS Training	0.270	0.001
Encountered Emergency and Emergency Course Attendance	0.256	0.002

CC: Correlation Coefficient; HS: Highly Significant ($P \leq 0.01$); S: Significant ($P \leq 0.05$)