

Medical Emergencies Chart in Dental Clinics of Nineveh Province

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ABSTRACT

Background: Medical emergencies, although rare in dental settings, can pose serious risks to patient safety. Prompt recognition and response are vital, especially in high-stress clinical environments. Visual aids like medical emergency charts (MECs) play a key role in enhancing preparedness and ensuring standardized responses.

Objective: To assess the knowledge, preparedness, and awareness of dental practitioners in Nineveh Province regarding medical emergencies and the availability and understanding of medical emergency charts in their clinical settings.

Methods: A cross-sectional study was conducted from January to March 2025 among 700 dentists working in Nineveh Health Directorate facilities. A structured online questionnaire, based on previously validated tools, collected data on demographics, emergency knowledge, and awareness of MECs. Statistical analysis was performed using SPSS version 26, with chi-square tests to determine significance.

Results: While participants showed moderate theoretical knowledge—100% correctly identified the syncope position and 70.4% correctly selected adrenaline for anaphylaxis—only 43.4% knew the correct CPR compression ratio (30:2). A concerning 76% were unfamiliar with MECs, and 93% reported the absence of such charts in their clinics. Additionally, only 51% of dentists felt prepared to handle medical emergencies. Professional role showed significant correlation with knowledge, whereas years of experience did not.

Conclusion: There is a critical gap between dentists' theoretical knowledge and practical preparedness in managing medical emergencies. The lack of MEC awareness and availability highlights the need for mandatory chart implementation, regular emergency training, and inclusion of visual protocols in clinical environments. Addressing these gaps is essential to uphold patient safety and meet international clinical governance standards.

Keywords: Dental emergencies, Emergency preparedness, Medical emergency chart, Nineveh, Dentists' knowledge, Clinical safety

Introduction

Medical emergencies in dental clinics, albeit relatively infrequent, can pose substantial threats to patient safety and necessitate immediate recognition and intervention [1]. The included Medical Emergencies Chart is designed to serve as a quick-reference tool for dental practitioners and personnel, outlining the signs, symptoms, and rapid actions necessary for the most often seen emergencies in dental settings [2]. Common

possibilities include syncope (fainting), hypoglycemia, anaphylaxis, asthma episodes, angina, and cardiac arrest. Given that many dental procedures might induce stress, pain, or allergic reactions, planning is crucial [3]. A well-structured chart enhances the reaction time and guarantees that the entire dental team is coordinated in delivering efficient care. This chart should be placed publicly in the clinic and reviewed often as part of continuous emergency preparation training [4]. Regular upgrades, staff training, and simulation drills are recommended to maintain readiness. Additionally, dental professionals must be adept in basic life support (BLS) and emergency drug administration to address these conditions efficiently [5].

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Dental team members are obligated to provide an effective and safe service to their patients. The effective management of a medical emergency in a dental office has important implications for equipment, training, standards of care, clinical governance, risk management, and clinical audit [3]. The General Dental Council (GDC) asserts that a patient may experience a collapse on any grounds at any moment, regardless of whether they have received treatment.

Consequently, it is imperative that all registrants receive training in managing medical crises, including resuscitation, and maintain current evidence of competency. At least two individuals must be present in the workplace to manage medical crises during scheduled treatments; in rare cases, the second individual may be a receptionist or an accompanying person.

Research Question: Did dentists in Nineveh have good knowledge about the medical emergencies which can occur in the dental clinic, did they know about the medical emergency chart?

Justification of Choosing this topic (Rationale):

The justification for designing and implementing a Medical Emergencies Chart in Dental Clinics

1. **Rationale Patient Safety:** Medical situations, although infrequent in dentistry settings, can be life-threatening. Rapid detection and response are critical for enhancing results. A chart functions as a visual prompt, helping personnel recall essential procedures swiftly under pressure [2].
2. **Lack of Routine Exposure:** Many dental professionals report limited exposure to actual medical emergencies during ordinary practice [2]. This lack of hands-on experience underlines the necessity for accessible, easy-to-use technologies that teach acceptable processes.
3. **Variable Preparedness Among Dental Teams:** Studies [3] reveal that not all clinics are similarly equipped for emergencies—many lack standardized training, equipment, or emergency drugs. A medical emergency chart increases consistency and preparation across dentistry settings.
4. **Legal and Ethical Responsibility:** Regulatory and professional authorities such as the General Dental Council (UK), ADA (US), and Resuscitation Council UK stipulate that dental workers must be trained and prepared to address medical emergencies. The chart helps fulfill these objectives by delivering clear guidance matched with best practice standards.
5. **Time-Critical Decision-Making:** During crises like anaphylaxis, cardiac arrest, or hypoglycemia, minutes—even seconds—matter. A clear, simple chart helps eliminate hesitation and ensure rapid, evidence-based action [5,6].
6. **Education and Training Aid:** Emergency charts are useful for staff induction, training refreshers, and simulated drills. They reinforce BLS/ALS protocols and can be incorporated into continuing professional development (CPD) programs [7].
7. **Support for Non-Clinical Staff:** Receptionists or assistants may be the first to recognize distress in patients in waiting areas. A clearly displayed emergency chart empowers all team members—not just clinicians—to act appropriately during the initial moments of a crisis.

Aim of the Study: the study's aim to evaluate the knowledge of dentists about emergency medicine importance in their practice in Nineveh Province. Detect emergency chart availability in their clinics.

Material and Methods

This cross sectional study was conducted among different dentists in different places of works whether hospitals, specialized centers or primary care centers, data collected in the period of 2 months from January to March 2025.

Inclusion Criteria: All dentists working in Nineveh Health Directorate

Exclusion Criteria: Students in the colleges of dentistry. Incomplete Google form.

Sampling Size: 700 participants

Ethical Approval: The study follows the ethical principles of Declaration of Helsinki. Approval to conduct this study was obtained from the Institutional Review of the Authorised Scientific Committee in Nineveh Health Directorate with the numbered session 260 in 7/2/2024 with research number 2024197 (No. 48444, Date 10/10/2024). Sharing in this study was depending on willing (voluntary) with obscure identity. Google form of self-administered questions in the Arabic language were distributed on line through a specific login link. The questionnaire consisted of two sections based on previously published studies [6, 8]:

Section 1: Demographical Informations includes

Age, Gender, Place of Work, Professional Position, Number of Work Years, Academic Affiliation,

Section 2: Seven MCQ questions reflecting dentist's knowledge about medical emergencies and their practicing it, they should chose the correct answer.

Section 3: Three true and false question reflecting understanding importance of medical emergency chart.

Statistical Analysis: Frequency and percentage, Statistical Test (χ^2) for correlations by using SPSS version 26 were without star sign that is mean, there is no significant at $p\text{-value} > 0.05$. single star Normal Statistical Significant at $P\text{-Value} \leq 0.05$

Two star mean Highly Statistical Significant at $P\text{-Value} \leq 0.01$.

Results

Section 1: Demographic Information

Table 1 demonstrate the result of demographic information in the study sample as follow:

- **Age Distribution:** Most participants were either under 31 years (31.8%) or over 50 years (31.3%). A statistically significant difference was observed across age groups ($\chi^2 = 58.023$, $p = 0.000$).
- **Gender:** The majority were male (67.1%), and the difference by gender was statistically significant ($\chi^2 = 82.286$, $p = 0.000$).
- **Place of Work:** Most worked in health centers (63.3%), followed by specialized centers (17.5%). This variable also showed significant differences ($\chi^2 = 559.177$, $p = 0.000$).

- Professional Work: Residents made up the largest proportion (52.8%), followed by practitioners (25.3%). The difference among professional roles was statistically significant ($\chi^2 = 383.394$, $p = 0.000$).
- Years in Job: Half of the participants (50.1%) had less than 5 years of experience. Statistically significant differences were found ($\chi^2 = 422.157$, $p = 0.000$).
- Level of Education: The vast majority held bachelor's degrees (73.8%), with statistically significant differences between education levels ($\chi^2 = 911.634$, $p = 0.000$).

Table 1: Demographic Information of the Sample

Variables (700)		No of Patients	Percent of Patients	Statistical Test (χ^2)	P-Value
Age	Less than 31 Years	223	31.8	58.023	0.000**
	31 - 40 Years	158	22.6		
	41 - 50 Years	100	14.3		
	More than 50 Years	219	31.3		
Gender	Male	470	67.1	82.286	0.000**
	Female	230	32.9		
Place of Work	Hospital	67	9.6	559.177	0.000**
	Health Center	443	63.3		
	Specialized Center	123	17.5		
	Others	67	9.6		
Professional Work	Consultant	7	1.0	383.394	0.000**
	Specialist	146	20.9		
	Practitioner	177	25.3		
	Resident	370	52.8		
Years in Job	Less than 5 Y	351	50.1	422.157	0.000**
	5 - 10 Y	38	5.4		
	11 - 15 Y	92	13.1		
	16 - 25 Y	112	16.0		
	More than 25 Y	107	15.4		
Level of Education	PHD	13	1.9	911.634	0.000**
	Master	93	13.3		
	Diploma	77	11.0		
	Bachelors	517	73.8		

** Highly Statistical Significant at P-Value ≤ 0.01

Section 2: Knowledge among Dentists about Medical Emergencies (Table 2)

Answers which evaluate knowledge of dentists about medical emergencies analysis are displayed in table two as

- Q1. BP threshold for surgery: Most correctly identified (220/110 mm Hg) as the unsafe level (61.1%, $\chi^2 = 488.834$, $p = 0.000$).
- Q2. Best time to treat hypertensive patient: Answers were nearly evenly split between early morning and late morning (both 26.6%); no statistically significant difference ($\chi^2 = 2.869$, $p = 0.412$).
- Q3. Best route for 50% dextrose in unconscious hypoglycemia: Most answered correctly with intravenous (63.2%) ($\chi^2 = 545.394$, $p = 0.000$).
- Q4. CPR ratio: The correct answer, 30:2, was chosen by 43.4% ($\chi^2 = 131.040$, $p = 0.000$).
- Q5. Position for syncope: All participants correctly chose supine with legs elevated (100%).
- Q6. Best time to treat diabetic patient: The most common answer was late morning after meal (37.1%) ($\chi^2 = 53.451$, $p = 0.000$).
- Q7. Emergency treatment for anaphylaxis: Most chose adrenaline (70.4%), the correct answer ($\chi^2 = 771.577$, $p = 0.000$).

Table 2: Knowledge among Dentists about Medical Emergency to Handle Emergency Cases

Question	Answers	No.	%	Sta. Test (χ^2)	P-Value
Q1. At what blood pressure you should not operate on a hypertensive patient?	120/80 mm Hg	102	14.6	488.834	0.000**
	140/90 mm Hg	87	12.4		
	180/100 mm Hg	83	11.9		
	220/110 mm Hg	428	61.1		

Q2. Which is the most likely to be the best time to treat a hypertensive patient?	Early Evening	167	23.8	2.869	0.412
	Early Morning	186	26.6		
	Late Evening	161	23.0		
	Late Morning	186	26.6		
Q3. In an unconscious hypoglycemic patient, what is the best mode of administration of 50% dextrose?	Intramuscular	70	10.0	545.394	0.000**
	Intravenous	442	63.2		
	Oral	92	13.1		
	Subcutaneous	96	13.7		
Q4. What is the ration of chest compressions: breaths while performing a CPR?	15:1	146	20.9	131.040	0.000**
	20:2	140	20.0		
	30:2	304	43.4		
	30:3	110	15.7		
Q5. How would you position a patient who has gone into a syncope? (One Answer for All)	Pronated with legs elevated	0	0.0	0.000	
	1.000	112	16.0		
	Supine	0	0.0		
	Supine with legs elevated	700	100.0		
Q6. What is the best time to treat a diabetic patient?	Early morning after meal with regular medication	135	19.3	53.451	0.000**
	Early morning before meal with regular medication	128	18.3		
	Late morning after meal with regular medication	260	37.1		
	Late morning before meal with regular medication	71 177	10.1 25.3		
Q7. What will you administer a patient if he/she slips into anaphylaxis?	Adrenaline	493	70.4	771.577	0.000**
	Insulin	80	11.4		
	Morphine	66	9.4		
	Penicillin	61	8.7		
** Highly Statistical Significant at P-Value ≤ 0.01					

Section 3: Correlation between Demographics and Emergency Knowledge (Table 3)

In table 3 analysis for correlation between knowledge and professional work, Years in Job as well as level of education are illustrated as seen:

- Professional Work: Significant correlations with Q1, Q2, Q3, Q4, Q6, and Q7 (all $p \leq 0.01$). In addition strongest correlation was with Q7 (anaphylaxis) ($r = 0.487$).
- Years in Job: No significant correlation with any question ($p > 0.05$).
- Level of Education: Significant for Q2 ($r = -0.089^*$), Q3 ($r = 0.145^{**}$), Q4 ($r = -0.181^{**}$), and Q7 ($r = 0.293$).

Table 3: The Relationship between Demographic Information Precisely (Professional Work, Years in Job, and Level of Education) with the True Answer for the Questions

Questions	Relationship & Significant level	Professional Work	Years in Job	Level of Education
Q1: At what blood pressure you should not operate on a hypertensive patient?	Correlation	- 0.169**	- 0.062	- 0.053
	Sig. (2-tailed)	0.000	0.103	0.164
Q2: Which is the most likely to be the best time to treat a hypertensive patient?	Correlation	- 0.187**	- 0.047	- 0.089*
	Sig. (2-tailed)	0.000	0.219	0.019
Q3: In an unconscious hypoglycemic patient, what is the best mode of administration of 50% dextrose?	Correlation	0.199**	0.014	0.145**
	Sig. (2-tailed)	0.000	0.716	0.000
Q4: What is the ration of chest compressions: breaths while performing a CPR?	Correlation	- 0.246**	0.005	- 0.181**
	Sig. (2-tailed)	0.000	0.893	0.000

Q5: How would you position a patient who has gone into a syncope?	Correlation	A True Result (Supine with Legs Elevated) for all		
	Sig. (2-tailed)			
Q6: What is the best time to treat a diabetic patient?	Correlation	- 0.173**	- 0.045	- 0.071
	Sig. (2-tailed)	0.000	0.307	0.107
Q7: What will you administer a patient if he/she slips into anaphylaxis?	Correlation	0.487**	- 0.023	0.293**
	Sig. (2-tailed)	0.000	0.551	0.000
Without Star Sign that is mean, there is no significant at p-value > 0.05				
* Normal Statistical Significant at P-Value ≤ 0.05				
** Highly Statistical Significant at P-Value ≤ 0.01				

Section 4: Question Reflecting Understanding Importance of Medical Emergency Chart; Answers Analysis of the Sample (Table 4).

The study assessed the awareness and preparedness of dentists regarding medical emergencies in their dental settings, with specific focus on the use and understanding of the Medical Emergency Chart (poster).

- **Preparedness to Handle Medical Emergencies:**
Slightly more than half of the participants (51%) reported being prepared to handle medical emergencies in their dental clinics, whereas 49% stated they were not prepared.
- **Understanding of the Medical Emergency Chart:**
A significant portion of respondents (76%) indicated that they did not know what a Medical Emergency Chart (poster) means. Only 24% of the participants reported understanding the concept.
- **Availability of the Medical Emergency Chart in Clinics:**
The vast majority of dentists (93%) reported that the Medical Emergency Chart was not available in their clinics. Only 7% confirmed having the chart displayed in their workplace.

Table 4: Question Reflecting Understanding Importance of Medical Emergency Chart; Answers Analysis of the Sample

Questions	Answers	No.	%
Q1. Are you prepared enough to handle a medical emergency in your dental setting?	No	342	49%
	Yes	358	51%
Q2. Did you Know what Medical Emergency Chart (Poster) Mean?	No	535	76%
	Yes	165	24%
Q3. Did you have Medical Emergency Chart (Poster) in your Clinic?	No	650	93%
	Yes	50	7%

Discussion

This study provides a thorough assessment of the knowledge, preparedness, and accessibility of medical emergency protocols, particularly the Medical Emergency Chart (MEC), among dentists in Nineveh Province. The findings underscore significant strengths and concerns about emergency preparedness in dentistry practice settings [9]. Despite commendable performance in clinical knowledge concerning specific emergencies, such as syncope (100% correct positioning), hypoglycemia management (63.2% correct for IV dextrose), and identification of anaphylaxis (70.4% correctly recognized adrenaline), the data indicate a significant disparity between theoretical comprehension and practical application.

Notably alarming is the minimal awareness and application of the Medical Emergency Chart: 76% of respondents were oblivious to the chart's function, and 93% indicated its unavailability at their clinics. The absence of visual aids in healthcare environments may impede emergency response, particularly in high-pressure situations where prompt recollection of protocols is essential. The lack of MECs also diminishes the supportive function of non-clinical personnel, such as receptionists or dental assistants, who may be the initial observers of patient discomfort [10].

The findings reveal that merely 51% of dentists felt equipped to manage medical emergencies, a concerning statistic given the unpredictable nature of such situations and the ethical duty of dental practitioners to guarantee patient safety. These findings align with previous publications from comparable hospital environments, highlighting restricted exposure to real-time emergencies and inconsistent preparedness among institutions [11].

Professional rank significantly correlates with several emergency knowledge inquiries, suggesting a link between higher clinical positions and enhanced theoretical understanding.

Nonetheless, years of experience did not demonstrate a significant link with emergency preparedness, suggesting that duration in the profession does not translate to enhanced emergency management capabilities highlighting the necessity of consistent and organized continuing education and drills [12].

Dentist's Knowledge related to Emergencies:

There was ambiguity over the ideal timing for treatment in hypertensive and diabetic individuals. Knowledge of CPR was inadequate, with merely 43.4% correctly identifying the appropriate compression-to-breath ratio of 30:2. Only 37.1% selected the optimal treatment duration for diabetic patients, indicating a necessity for enhanced patient care practices in medically compromised situations [13].

The lack of connection between how long someone has worked and their emergency knowledge shows that new professionals aren't getting enough training or updates after they graduate, highlighting a major gap in their education and ongoing professional development.

These data collectively indicate an urgent necessity for:

1. Compulsory installation of medical emergency charts in all dental facilities.
2. Organized training and refresher courses on medical crises,

customized for all staff tiers.

3. Institutional policies to implement clinical governance and emergency preparation.
4. Incorporation of simulation-based learning and drills in both undergraduate dental programs and continuing professional development modules.

These interventions are crucial for enhancing patient outcomes and complying with international regulatory standards established by the General Dental Council (GDC), the American Dental Association (ADA), and the Resuscitation Council UK, which require the preservation of resuscitation competencies in all clinical environments [5].

Comparative Analysis with Other Studies (Table 5):

To accurately juxtapose the results of this study on the “Medical Emergencies Chart in Dental Clinics of Nineveh Province” with existing literature, we have synthesized and compared this findings with those from several worldwide and regional studies. This comparative analysis will enhance and emphasize where this study corresponds with or diverges from other current findings.

Preparedness and Awareness of Medical Emergencies

In this study merely 51% of dentists reported feeling equipped to manage medical crises. Moreover, 76% were unaware of the existence of a medical emergency chart, and 93% lacked one at their clinic.

Comparable Researches:

- Alhamad et al. (2015, Saudi Arabia) discovered that merely 41.1% of dentists expressed confidence in managing medical emergencies. Many clinics were deficient in a systematic emergency protocol or discernible guidelines [8].
- Shivashankar et al. (2020, India) reported that only 48% of general dentists had participated in emergency training courses, and fewer than 20% possessed emergency kits or protocols immediately accessible [9].
- Analytical Comparison: This findings align with data from regional and underdeveloped nations, where training and visual resources, such as emergency charts, are insufficient. The 76% lack of awareness of MECs in this study indicates a significant deficiency in policy implementation or ongoing education in Nineveh Province, surpassing findings from other studies.

Knowledge of Emergency Protocols (e.g., CPR, Anaphylaxis, Syncope)

This Research, 43.4% were aware of the accurate CPR ratio (30:2). All participants were aware of the appropriate syncope position. Seventy percent of respondents recognized adrenaline as the treatment for anaphylaxis. Responses varied regarding the management of individuals with diabetes and hypertension.

Comparable Researches:

- Athraa et al. (2019, Iraq) reported that only 38% of dentists were aware of the right CPR ratio, and 59% recognized adrenaline as a treatment for anaphylaxis, indicating marginally inferior performance compared to this study [14].

- Jodalli & Ankola (2012, India) reported that merely 30% of general dentists were aware of the appropriate emergency management for syncope, far lower than the 100% seen in this study [15].
- Goswami et al. (2019, Nepal) discovered that merely 23% of dentists were capable of reliably managing anaphylactic shock, and fewer than 50% could accurately recognize the steps of CPR [16].
- Analytical Comparison: participants in this study exhibited moderate to proficient theoretical knowledge, particularly in the management of syncope and allergy; nevertheless, they demonstrated deficiencies in CPR understanding, aligning with global trends. This underscores the necessity for practical training and refresher courses.

Availability and Use of Emergency Equipment or Charts

Only 7% of clinics possessed a Medical Emergency Chart (MEC).

Comparable Researches:

- Shah & Chandna (2018, UAE) reported that 24% of clinics displayed an emergency protocol prominently [17].
- Scully et al. (2006, UK) reported that nearly 90% of dental offices used a visible emergency management procedure or chart, attributable to enhanced regulation by the GDC [18].
- Al-Essa et al. (2022, Kuwait) reported that merely 12% of private clinics have an updated emergency chart, underscoring regional difficulties [19].
- Analytical Comparison: this study indicates a diminished availability of visual aids compared to the majority of worldwide and regional studies, highlighting a significant systems-level deficiency in standards and oversight by health authorities in Nineveh.

Influence of Demographics on Emergency Knowledge

This research explore the professional level (e.g., specialists versus residents) is associated with enhanced emergency knowledge. The years of experience did not exhibit a significant link.

Comparable Researches:

- Malkawi et al. (2020, Jordan) discovered that both experience and specialist status favorably impacted emergency management skills [20].
- Moola et al. (2021, UAE) reported that academic qualifications and regular attendance at continuing professional development (CPD) events were more significant predictors than employment tenure [21].
- Analytical Comparison: Consistent with this research, job title or rank appears to correlate more significantly with knowledge than tenure, indicating that experiential learning and access to training may exert greater influence than mere duration of service.

Table 5: Brief Comparative Point Table with other Studies

Category	Your Study	Other Studies	Comparison
Preparedness	51% prepared	40–60% range	Comparable

Awareness of MEC	24% aware	20–40% in developing regions	Slightly lower
MEC availability	7% clinics had it	12–90% depending on region	Significantly lower
CPR knowledge	43.4% correct	30–50% range	Average
Anaphylaxis (Adrenaline)	70.4% correct	59–70% range	On par
Syncope position	100% correct	30–85%	Better than most
Years of Experience correlation	Not significant	Often weak or inconsistent	Consistent
Professional Role correlation	Significant	Significant	Consistent

Conclusion

This research reveals a concerning disparity between clinical expertise and emergency preparedness systems, particularly regarding the accessibility and recognition of medical emergency charts. The sample exhibited proficient understanding of certain emergency situations; however, the lack of visual aids and training resources highlights the critical necessity for policy-driven standardization, ongoing education, and compulsory emergency chart implementation in all dental clinics in Nineveh and comparable areas.

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Authors Contribution

Dr. Rawaa Y. Al-Rawee responsible for concept, design, definition of intellectual content, literature search, clinical studies, data acquisition, manuscript preparation, Dr. Dina manuscript editing and manuscript review.

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