

## Evaluating the Incidence, Response, and Management Proficiency of Medical Emergencies in Dental Practices

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### Abstract:

#### Background:

Dental professionals must be ready to respond quickly and effectively to medical emergencies that may arise in unexpected locations, such as dental offices. Given its sizable population and expanding dental sector, Pakistan is not exempt from such potential catastrophes.

#### Objectives:

The objective of this study was to determine the frequency of medical emergencies in dental outpatient departments (public and private). In addition, we aimed to pinpoint any inadequacies in procedures that impede efficient administration and offer ideas for enhancing the capacity to handle medical crises in dental offices.

#### Methods:

In a six-month cross-sectional study, dental professionals were given a reliable, closed-ended questionnaire to evaluate their attitudes, procedures, and level of expertise in handling medical emergencies. A total of 271 responses were evaluated.

#### Results:

Most instances recorded in medical crises were syncope (36%), followed by hypoglycemia (26%). The majority of reported medical situations (77.8%) were managed successfully within the hospital according to the findings of the study. Of the practitioners, approximately 55.9% adhered to all required guidelines for handling medical emergencies, while 34.8% only partially did so. Approximately 69.6% of practitioners did not follow the protocol when it came to using emergency equipment or drugs.

Approximately 65% of practitioners stated that the most difficult aspects of handling medical emergencies were panic or disorientation and a lack of training. Dental professionals and personnel were trained in basic life support (39%), demonstration/lectures (21%), and addressing medical crises (figure 2).

#### Conclusion

The fact that medical emergencies at dental offices are uncommon does not mean that a large percentage of dentists are well equipped to manage these circumstances. By filling these gaps, the dental profession can improve patient safety and emergency practitioner competencies.

#### Key words:

Medical emergencies, dental practice, management, and proficiency.

#### Introduction:

Dental chairs serve a critical function in healthcare by facilitating various oral health services across diverse

patient populations. While routine dental procedures are generally considered safe, infrequent medical emergencies may arise, necessitating prompt and effective intervention from dental professionals. Ascertaining the prevalence of such incidents is crucial for improving patient care and ensuring that practitioners are adequately prepared (1,2). Through a comprehensive analysis of reported cases and their associated risk factors, dental professionals can refine their approach, enabling expeditious and appropriate responses in emergency situations. Although research consistently demonstrates a low incidence of medical emergencies in dental settings, the precise rate may vary (3).

A comprehensive 2016 study by Atherton et al. highlighted that the prevalence of emergencies differs depending on the country and the clinical environment. They identified syncope, allergic reactions,

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hypoglycemia, and cardiac incidents as the most common emergencies (4). Studies from developed countries such as the United States and the United Kingdom suggest that an average dentist will encounter approximately 7.5% of medical emergencies throughout their careers (Müller et al., 2021). Conversely, the incidence appears to be slightly higher in developing regions, such as Southeast Asia and the Middle East, possibly due to less rigorous patient screening before treatment. Local research in Pakistan and neighboring countries indicates that underlying systemic health issues, particularly diabetes and cardiovascular conditions, significantly increase the risk of emergencies during dental care (5).

The most frequently reported emergencies in dental practice include the following.

1. Syncope: Often triggered by anxiety or sight of blood, syncope is one of the most common occurrences in dental settings.
2. Allergic Reactions: Some dental materials, especially anesthetics, can cause mild-to-severe allergic responses, potentially leading to anaphylaxis.
3. Hypoglycemia: Patients with diabetes are susceptible to low blood sugar levels, particularly if they have been fasting for long periods before, during, or after treatment.
4. Cardiovascular Event: While rare, serious conditions such as myocardial infarction or angina require immediate intervention (Cherukuri et al., 2019) (2).

Dental professionals must be prepared to efficiently handle unexpected emergencies. This also applies to Pakistan, where the dental industry is growing alongside a large population, making the potential for emergencies a real concern (6). A valuable reference in this area is an article by Akbar-Khanzadeh et al. published in the *Journal of Dental Research, Dental Clinics, Dental Prospects* (2017), which offers a thorough overview of recognizing, preventing, and managing medical emergencies in dental offices (7). This study emphasizes the importance of maintaining current guidelines and training to ensure high standards of patient care.

The prevalence of medical emergencies in Pakistani dental offices poses a significant challenge for practitioners (2,7). Prioritizing preparedness, continuous training, and strict adherence to protocols are essential for safeguarding patient well-being. Creating a safe environment should be a top priority for reducing the risks of medical emergencies (8).

Numerous studies have explored the incidence of medical emergencies in dental offices, shedding light on the patterns and specific incidents. For example, a comprehensive study by Girdler et al. (2000) focused on the prevalence of allergic reactions, cardiovascular events, and respiratory issues (9). Their research underscored the need for ongoing training to ensure that dental practitioners can effectively manage such crises.

Similarly, Wong and Grisbrook (2018) assessed emergency management in private dental practices, stressing the importance of standardized procedures and proper equipment. They found that emergencies range from syncope to anaphylaxis, reinforcing the need for a well-trained adaptable dental team (10).

Investigating the frequency of medical emergencies in dental settings is valuable for various stakeholders, including practitioners, policymakers, and patient communities. By better understanding the types and rates of these emergencies, stakeholders can enhance protocols and emergency preparedness (11,12).

Dental practices must be equipped with appropriate protocols, equipment, and trained personnel to effectively manage medical emergencies. Assessing patient awareness of emergency protocols and their comfort level when discussing health concerns can help ensure readiness in handling critical situations (13). Evaluating practitioner knowledge and preparedness is essential for maintaining patient safety (14,15). Collecting detailed medical histories, including allergies, medication use, and existing health conditions, enables dentists to assess risks and adjust their treatment approaches accordingly, thus minimizing the chances of an emergency (11).

This study aimed to evaluate risk factors, promote communication among dental professionals to enhance patient safety, and optimize emergency response preparedness in dental settings. Gathering this critical information helps to address patient concerns and take proactive steps to reduce the likelihood of emergencies occurring during dental procedures.

This research aimed to analyze the frequency and nature of medical emergencies in dental offices, providing insights into how to better manage such incidents. By reviewing the literature and existing data, we hope to contribute to the refinement of emergency protocols and ultimately to the enhancement of patient safety.

#### **Objectives:**

To determine the frequency of medical emergencies in Dental OPDs (public and private).

To identify potential gaps in practices that hinder effective management while proposing capacity-building strategies to manage medical emergencies in dental practice.

#### **Material and methods:**

The study was a cross-sectional survey conducted over six months, from June 2023 to December 2023. The sample size was determined using a 95% confidence interval, resulting in 271 participants, calculated using OpenEpi software. A non-probability convenience sampling technique was used. The study included dentists aged 18 years and above working in both public and private dental outpatient departments (OPDs) and clinics. Patients who

refused to provide consent were excluded. This multi-center study was approved by the Institutional Review Board **IRB reference number DSH/IRB/2023/0052**, and dentists meeting the inclusion criteria were invited to participate.

To ensure the validity of the questionnaire, face validation was employed, which involved expert assessments to confirm that the questions accurately captured the intended constructs. Cronbach's alpha was used to test the reliability of the questionnaire, with most items having a coefficient of 0.7 or higher. A total of 318 questionnaires were collected; however, after screening for incomplete or incorrectly filled forms, data from 271 questionnaires were analyzed.

Informed consent was obtained from all participating dentists with a full explanation of the study protocol. The questionnaire covered several key topics.

1. Demographic information relevant to the study
2. The frequency of medical emergencies encountered by the dentist
3. The care delivery system in place
4. The dentist and their team's competency in managing emergencies
5. Areas for improvement in care delivery and feedback on management practices.

### Results:

Almost 80.7% of the 270 dental professionals who participated in this study were from Karachi city. As indicated in Table 1, most dental practitioners (40.4) had less than two years of clinical experience, followed by 31.1 with three to five years. Eighty-seven percent of dentists stated that medical emergencies occur infrequently in their profession. Figure 1 illustrates that most instances recorded in medical crises were syncope (36%), followed by hypoglycemia (26%). The majority of reported medical situations (77.8%) were managed successfully within the hospital according to the findings of the study. Of the practitioners, approximately 55.9% adhered to all required guidelines for handling medical emergencies, while 34.8% only partially did so. Approximately 69.6% of practitioners did not follow the protocol when it came to emergency equipment or drugs. Table 2 illustrates that approximately 65% of the practitioners stated that the most difficult aspects of handling medical emergencies were panic or disorientation and a lack of training. Dental professionals and personnel were trained in basic life support (39%), demonstration/lectures (21%), and addressing medical crises (figure 2).

Table 1-demographic details

Characteristics		N	%
Location of dental practice	Islamabad	4	1.5
	Karachi	218	80.7
	Lahore	9	3.3
	Layyah	4	1.5
	Mardan	5	1.9
	Pakistan	22	8.1
	Quetta	4	1.5
	Sialkot	4	1.5
Number of dental practitioners in your setup	1.00	36	13.3
	2.00	33	12.2
	3.00	29	10.7
	4.00	28	10.4
	5.00	21	7.8
	More than 5	123	45.6
Years of clinical experience	3 to 5 years	84	31.1
	5 to 10 years	18	6.7
	less than 2 years	109	40.4
	more than 10 years	59	21.9
How often do medical emergencies occur in your dental practice	Frequently (monthly)	25	9.3
	Never	9	3.3
	Occasionally (a few times a year)	98	36.3
	Rarely (less than once a year)	138	51.1

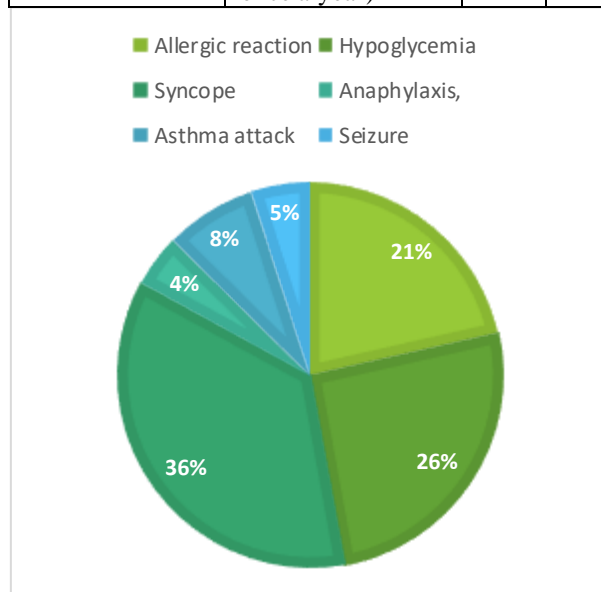
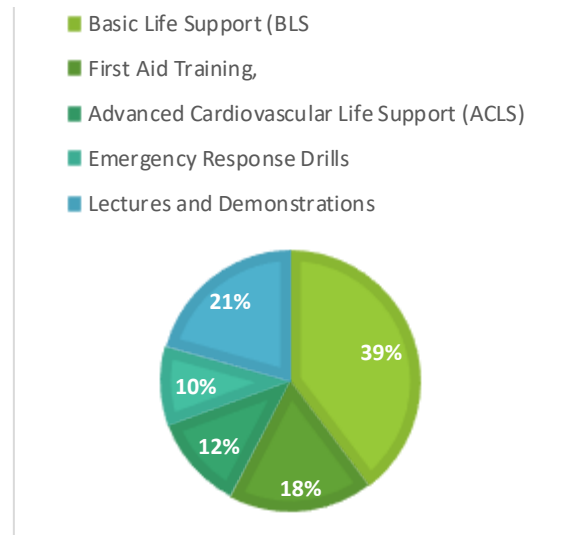


Figure 1: Types of medical emergencies frequently reported.

**Table 2: Managing proficiency and capacity building related to anticipated outcomes of medical emergencies among dental practitioners.**

Characteristics	N	%
Outcome of the most recent medical emergency in your practice	Fatality	9 3.3
	Managed effectively within the facility	210 77.8
	Required hospitalization	9 3.3
	Resolved without further medical intervention	42 15.6
Standard Protocols for managing medical emergencies	No	25 9.3
	Present with certain deficiencies	94 34.8
	Yes	151 55.9
Emergency protocol reviewed and updated	Annually	118 43.7
	Biannually	59 21.9
	Every 5 years	16 5.9
	Never	77 28.5
Have you ever had to use emergency equipment or medications	No	188 69.6
	Other	4 1.5
	Yes	78 28.9
How often do your dental practitioners and staff undergo emergency response training?	Annually	83 30.7
	Every six months	46 17.0
	Every two years	38 14.1
	Rarely	103 38.1
What challenges have you faced in managing medical emergencies in your practice?	Delayed response time	21 7.8
	Inadequate equipment	73 27.0
	Lack of training	86 31.9
	Panic or confusion	90 33.3



**Figure 2: Types of training dental practitioners and staff received for handling medical emergencies.**

**Discussion**

The data we collected show that while medical emergencies in dental offices may not occur on a yearly basis, they do occur frequently enough to cause concern. This finding is consistent with other studies that reported that many dental practices encounter such situations (16). Globally, the most common emergencies reported are hypoglycemic episodes, allergic reactions, and syncope. Although serious complications such as cardiac arrest and anaphylaxis are rare, the potential for these events emphasizes the importance of being prepared (17). Research indicates a gap between dental practitioners' theoretical knowledge and their ability to manage medical emergencies. A European study found that only 30% of dentists felt confident in their ability to handle such emergencies (Malamed, 2020), suggesting a need for more foundational and continuous education in emergency management (18,19). Furthermore, a 2021 study by Müller et al. revealed that many dental clinics lack essential emergency equipment. Deficiencies in emergency kits coupled with insufficient Basic Life Support (BLS) training further limit the ability of dental practitioners to respond effectively (5). This issue is especially pertinent in countries with lax regulations for emergency preparedness training, as highlighted by Cherukuri et al. (2019). In Pakistan, for example, access to regular emergency training workshops is limited and many dentists continue to use outdated methods (Ali et al., 2018). Practical simulations and BLS certification are vital for ensuring competence in emergency management (20,21).

Although many dentists have received basic emergency management training, the data showed varying levels of confidence and practical skills in handling these situations. This aligns with the findings of Black and

Green (2018), who reported that while dental staff are required to take CPR and BLS courses, many feel unprepared to manage crises outside the classroom setting (22). Most emergency care provided by registered dentists involves basic interventions, such as positioning patients correctly and administering oxygen, whereas more advanced procedures are rarely performed (23). This suggests that more comprehensive and hands-on training rather than just theoretical education would be beneficial. Research by Haas (2019) also emphasizes the importance of integrating emergency medicine into dental education, covering not only symptom recognition but also appropriate interventions, such as CPR, defibrillator use, and oxygen administration (24).

The frequency and timing of training in medical emergencies are positively linked to the competence of dental professionals in managing these situations. Recent Advanced Life Support (ALS) course performed better in simulated emergency scenarios than those without such training (25). This supports the conclusion of Brown et al. (2022) that maintaining high standards of care in dental settings requires continuous professional development for emergency management (26).

In conclusion, proficiency among dental professionals in managing medical emergencies improves with regular hands-on training, reinforcing the need for ongoing education to ensure high-quality patient care.

#### Relevance in Practice:

Both government authorities and dentists should be aware of these facts. Therefore, regular training in real-world medical situations is necessary. Additionally, dental clinics are required to maintain a certain set of standard emergency medications, instruments, and supplies, all of which must be routinely audited. Enhancing dental staff preparedness will not only improve patient safety, but also reduce anxiety among practitioners who often feel unprepared.

#### Limitations of the study

Considering the small sample size and the geographic focus of the data collection, it is possible that the findings do not accurately represent the realities of dental practices in other countries or regions, where training programs, healthcare systems, and resource availability may differ significantly. Additionally, the use of self-reported questionnaires or interviews may introduce bias, as dentists may have overestimated their preparedness or downplayed their prior experiences with medical emergencies due to social desirability bias.

#### Conclusion:

In summary, the rarity of medical emergencies in dental offices does not imply that a high proportion of dentists are adequately prepared to handle such situations. The field of dentistry can increase patient safety and emergency practitioner skills by addressing these gaps.

#### References:

1. Al-Iryani GM, Ali FM, Alnami NH, Almashhur SK, Adawi MA, Tairy AA. Knowledge and preparedness of dental practitioners on management of medical emergencies in Jazan Province. *Open Access Maced J Med Sci.* 2018;6(2):402.
2. Haas DA. Management of medical emergencies in the dental office: conditions in each country, the extent of treatment by the dentist. *Anesth Prog.* 2006;53(1):20–4.
3. Šink Ž, Umek N, Šoštarič M. Medical emergencies in dental offices. *Zdrav Vest.* 2019;88(7–8):348–59.
4. Sanderson S. Medicolegal Considerations in Providing Emergency Dental Care in Practice. *Prim Dent J.* 2017;6(2):20–5.
5. Shaik N, Mukthini S, Akshay BK, Ramadevi M, Chandana M, Saishivani M. PERCEPTION ABOUT MEDICAL EMERGENCY AMONG DENTAL UNDERGRADUATE INTERNS IN TELANGANA STATE: QUALITATIVE EXPLORATORY STUDY.
6. Ramli NM, Tarmidzi NAA, Samsuddin AD, Idaham NI, Ibrahim AZ. A pilot study of Preparedness for Medical Emergencies in Urban Private Dental practices in Malaysia. *Archives Of Orofacial Science.* 2019;99–111.
7. Al Ghanam MA, Khawalde M. Preparedness of Dentists and Dental Clinics for Medical Emergencies in Jordan. *Mater Sociomed.* 2022;34(1):60.
8. Hong CL, Lamb AW, Braodbent JM, De Silva HL, Thomason WM. An update on New Zealand oral health practitioners' preparedness for medical emergencies. *New Zealand Dental Journal.* 2017;113(4):5–12.
9. Lv N, Sun M, Polonowita A, Mei L, Guan G. Management of oral medicine emergencies during COVID-19: A study to develop practise guidelines. *J Dent Sci.* 2021;16(1):493–500.
10. Sangavi R, Kumar M. Medical Emergencies in Dentistry-A Guide to a Successful Practise. *Journal of Pharmaceutical Sciences and Research.* 2021;13(7):387–92.
11. Sharma DA, Neha D, Gupta DR, Sharma DI, Sahi DS, Sharma DS. A brief review of medical emergencies in dental practise. *Int J Appl Dent Sci.* 2020;6(3):679–83.
12. Jevon P, Shamsi S. COVID-19 and medical emergencies in dental practice. *Br Dent J.* 2020;229(1):19–24.
13. Al Ghanam MA, Khawalde M. Preparedness of Dentists and Dental Clinics for Medical Emergencies in Jordan. *Mater Sociomed.* 2022;34(1):60.
14. Vijayan AA. Evaluation of Oral and Maxillofacial Surgeons' Knowledge, Experience, and Attitude Regarding Cardiopulmonary Resuscitation in Kerala.
15. Tewari N, Sultan F, Mathur VP, Rahul M, Goel S, Bansal K, et al. Global status of knowledge for prevention and emergency management of traumatic dental injuries in dental professionals: systematic review and meta-analysis. *Dental Traumatology.* 2021;37(2):161–76.
16. Gopal S. K, Sangavi. R, Mahesh Kumar. P. Medical Emergencies in Dentistry–A Guide to A Successful Practise. *Int J Dentistry Oral Sci.* 2021;8(11):4991–6.
17. Sangavi R, Kumar M. Medical Emergencies in Dentistry-A Guide to a Successful Practise. *Journal of Pharmaceutical Sciences and Research.* 2021;13(7):387–92.
18. Sacoos S, Chana S, Fortune F. The dental team as part of the medical workforce during national and global crises. *Br Dent J.* 2020;229(2):89–92.
19. Jevon P. Medical emergencies in the dental practice poster: revised and updated. *Br Dent J.* 2020;229(2):97–104.

20. Lv N, Sun M, Polonowita A, Mei L, Guan G. Management of oral medicine emergencies during COVID-19: A study to develop practise guidelines. *J Dent Sci.* 2021;16(1):493–500.
21. Rosenberg M. Preparing for medical emergencies: the essential drugs and equipment for the dental office. *The Journal of the American Dental Association.* 2010;141: S14–9.
22. Cruickshank R, McDonnell A, Wright F. Management of acute dental problems: an aide-mémoire for referrals to oral and maxillofacial surgery. *Br Dent J.* 2022;233(4):266–70.
23. Akinlotan MA, Ferdinand AO, Maxey HL, Bolin JN, Morrissey MA. Dental hygienists' scope of practice regulations and preventable non-traumatic dental emergency department visits: A cross-sectional study of 10 US states. *Community Dent Oral Epidemiol.* 2023;51(2):274–82.
24. Nimbalkar G, Dubey N, Mandwar S, Dharmapuria S, Reche A, Chhabra KG. Dental practice guidelines in the precariousness of COVID-19: a review. *Int J Curr Res Rev.* 2020; 12:82–7.
25. Association BD. Medical emergencies. *BDJ In Practice.* 2024;37(2):58–9.
26. Smereka J, Aluchna M, Aluchna A, Szarpak Ł. Preparedness and attitudes towards medical emergencies in the dental office among Polish dentists. *Int Dent J.* 2019;69(4):321–8.

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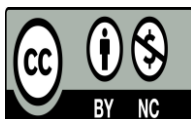
**Author's Contribution:**

Dr. Ayesha: Conception and Design of work

Dr. Nigarish Javaid: drafting and critical evaluation for intellectual context

Prof. Dr. Zahid Ali: Approval of version to be submitted

Dr. Mahrukh Iqbal: Accountable for all aspects of the work



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