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Knowledge, Attitude and Preparedness of Medical Emergencies in Dental Practice in Maharashtra A Questionnaire Based Study

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ABSTRACT

Introduction : Medical emergencies in dental practice, though rare, require prompt and effective management. Factors like patient anxiety, underlying systemic conditions, and potential medication reactions place dental practitioners in critical situations where swift action is essential. This study explores the knowledge, attitudes, and preparedness of dental professionals for managing medical emergencies, offering actionable recommendations for improving safety in dental care settings.

Methodology: A cross-sectional study was conducted among dental students and dentists in Maharashtra, India, to assess their knowledge, attitude, and management of medical emergencies. The survey included 23 validated questions covering demographics, qualifications, and years of practice. A pilot study involving 56 participants established good reliability (Cronbach's alpha: 0.823), determining a final sample size of 250 participants. Data analysis was performed using SPSS software with a significance level of $p < 0.05$.

Results: The survey results reveal a fair understanding of common medical emergencies like syncope, hypoglycemia, anaphylaxis, and asthma. Respondents demonstrated good recognition of critical symptoms, including rapid pulse, dizziness, difficulty in breathing, rash, and swelling. Most participants emphasized the necessity of maintaining emergency drug kits with essentials such as epinephrine, nitroglycerin, albuterol, glucose, aspirin, and oxygen.

Conclusion: Dental practitioners in Maharashtra exhibit a moderate level of preparedness for medical emergencies, with strengths in symptom recognition and awareness of emergency drug kit essentials. The study underscores the need for enhanced training and curriculum improvements to bridge knowledge gaps and improve emergency responsiveness in dental practice.

Keywords: Medical Emergencies, Syncope, Knowledge, Preparedness

1. Introduction

Medical emergencies in dental practice, though infrequent, pose significant challenges that require prompt and effective management. The nature of dental interventions, combined with patient factors such as anxiety, underlying systemic conditions, and potential reactions to medications, places dental practitioners in situations where they must act swiftly to prevent adverse outcomes. These emergencies can range from mild incidents, such as vasovagal syncope, to life-threatening conditions like cardiac arrest or anaphylaxis. Thus, the dental team's ability to recognise, respond to, and manage emergencies is critical for ensuring patient safety.

Studies suggest that the prevalence of medical emergencies in dental practices is increasing, partly due to an aging population and the rise in comorbidities among dental patients (1, 2). Common emergencies include syncope, hypoglycaemia, seizures, angina pectoris, asthma attacks, and allergic reactions (3). Research also indicates that over 50% of dental practitioners are likely to encounter a medical emergency at some point in their careers, underscoring the importance of preparedness (4).

Managing medical emergencies in dental practice requires a combination of knowledge, appropriate attitude, and adequate resources. Knowledge pertains to understanding the etiology, recognition, and protocols for managing emergencies. The attitude of dental practitioners reflects their confidence, willingness, and ability to respond during high-pressure situations. Finally, preparedness involves maintaining essential emergency equipment, regularly updating skills through training, and implementing structured protocols (5). A lack of any of these components can lead to delayed interventions, increased risk to the patient, and potential medico-legal consequences (6).

Despite the critical nature of emergency preparedness, numerous studies have identified deficiencies in the readiness of dental professionals. A survey conducted in the United Kingdom revealed that while most dental practices had some emergency equipment, there was considerable variability in the availability of critical items such as automated external defibrillators (AEDs) and adrenaline auto-injectors (7). Similar studies in other countries have highlighted gaps in training and confidence among practitioners in managing emergencies (8, 9). The irregularity of Basic Life Support (BLS) training and limited exposure to emergency situations were cited as key contributors to this lack of preparedness (10, 11).

Thorough pre-treatment assessments are vital for identifying patients at risk of emergencies. Taking a detailed medical history and understanding the patient's physical and psychological status can help mitigate potential triggers (12). Additionally, strategies such as effective communication, anxiety-reduction techniques, and pharmacological sedation protocols can minimise the likelihood of emergencies (13). Regular drills, continuing education programs, and adherence to guidelines from professional organisations are essential for maintaining a high level of preparedness (14).

This study aims to explore the knowledge, attitudes, and preparedness of dental professionals regarding medical emergencies which will help provide actionable recommendations for improving safety and responsiveness in dental care settings.

2. Methodology:

This cross-sectional study was conducted among Dental students and Dentist's in Maharashtra, India to assess their Knowledge, Attitude and Management of Medical Emergencies in Dental Practice in Mahar ashtra. Undergraduate,Interns, postgraduate students and practitioners who were ready to participate are included in the study.

The study questionnaire consisted of close-ended multiple choice questions related to Medical Emergen

cies in Dental Practice. The questions were based on different medical emergencies present, common medical emergencies encountered, their management etc. A total 23 questions were developed along with information on age, sex, qualification, number of practice years . Data were collected by giving information about study through a structured, pre-tested, close ended questionnaire administered online via google form through WhatsApp to maximise participation. Content validity and reliability was ensured through expert review and pilot study conducted among 56 participants. The pilot study helped to calculate sample size of 250 participants and Cronbach's alpha value of 0.823 suggesting good reliability of questions.

Descriptive statistics, such as means, standard deviations, and percentages, were used to summarise demographic and knowledge data. Chi-square tests were employed to determine associations between demographic variables and knowledge levels, while t-tests were applied to compare differences in knowledge, attitudes, and practices across academic years. Data analysis was performed using SPSS software, with a significance level set at $p < 005$. This methodology provides a robust framework for identifying knowledge gaps among dental students, enabling informed recommendations for curriculum enhancements.

3. Results:

The survey results offer a detailed examination of the respondents' demographics, knowledge, experiences, and perspectives regarding emergency preparedness, showcasing strengths and revealing areas requiring improvement. The gender distribution indicates a predominance of male participants, with 64.8% identifying as male and 35.2% as female. A balanced representation is observed between educational qualifications, with 58.0% holding a Bachelor of Dental Surgery (BDS) degree and 42.0% possessing a Master of Dental Surgery (MDS). This mix ensures that insights are drawn from both foundational practitioners (BDS) and those with advanced specialisation (MDS), offering a comprehensive perspective on professional dynamics. The age distribution highlights the dominance of early to mid-career professionals in the field. The largest group is 28 years old, accounting for 26.8% of the population, followed by 27 years at 22.4% and 29 years at 15.6%. These figures indicate that the majority of professionals are in their late 20s, a stage where they are actively gaining practical experience and honing their expertise.The representation tapers off in both younger and older age groups. For instance, individuals aged 34 years constitute only 1.2%, while 32 years and 33 years account for 3.2% and 4%, respectively. This distribution suggests a steady decline in representation as age increases, likely due to career transitions or a reduced focus on professional practice. Similarly, younger groups, such as those aged 26 years (12.8%), are relatively underrepresented, reflecting the time required for academic qualifications and professional entry. Emergency situations commonly encountered by the respondents **[Table 1]** include syncope (51.2%), which was the most frequent, followed by hypoglycaemia (23.2%) and anaphylaxis (14.4%). Other cases, such as asthmatic attacks (8.0%) and miscellaneous emergencies (3.2%), were less frequently reported. Regarding symptom recognition, 45.2% of respondents correctly identified allergic reaction symptoms such as difficulty in breathing, rash, and swelling. Another 40.8% recognized signs like rapid pulse and dizziness, linked to conditions such as syncope. However, smaller percentages identified symptoms associated with infections (7.2%) or expressed uncertainty (6.8%), suggesting varying levels of diagnostic accuracy.

Table 1 : Emergency situations commonly encountered

Responses	Count	Percentage
Syncope	128	51.2%
Hypoglycemia	58	23.2%
Anaphylaxis	36	14.4%
Asthmatic Attack	20	8.0%
Others	8	3.2%

Knowledge of emergency medications was generally strong, with 56.4% of respondents aware of the appropriate use of epinephrine, nitroglycerin, albuterol, glucose, aspirin, and oxygen in emergencies. However, a notable proportion (21.2%) reported familiarity with only aspirin and glucose, while 14.8% relied on painkillers, reflecting gaps in comprehensive pharmacological understanding. When addressing cardiac arrest scenarios **[Table 2]** , 54.8% followed recommended procedures, including checking responsiveness, calling for help, and performing CPR. Yet, 30.4% mistakenly advocated immediate chest compressions without assessing responsiveness, revealing misconceptions about basic life support protocols. The importance of emergency preparedness was widely acknowledged, with 75.6% considering it very important, 15.2% somewhat important, and only a small minority (2.8%) deeming it not important at all.

Table 2: Knowledge about the basic steps of Basic Life Support (BLS)

Responses	Count	Percentage
Check responsiveness, call for help, perform CPR	137	54.8%
Start chest compressions immediately without checking responsiveness	76	30.4%
Provide only rescue breaths	24	9.6%
I am not sure	13	5.2%

Training schedules showed variability, with most respondents reporting monthly training sessions (51.2% for emergency preparedness, 55.6% for updates, and 50.0% for maintaining knowledge). Quarterly and annual training sessions were less common, indicating differences in institutional practices. The primary sources of knowledge updates were professional courses (44.8%), followed by online resources and journals (34.4%). Interaction with colleagues and mentors accounted for 15.6%, while 5.2% reported no ongoing education, emphasising the need for structured and consistent training opportunities.

Table 3 : Account of Medical emergency encounter

Responses	Count	Percentage
In the waiting room	88	35.2%
During the procedure	112	44.8%
At the end of the procedure	25	10.0%
Not encountered at all	25	10.0%

The analysis of emergency events reveals significant trends in their progression across severity levels. **[Table 4]** Severe bleeding, syncope, allergic drug reactions, and asthmatic attacks show varying frequencies, with severe bleeding peaking at 29.5% and asthmatic attacks at 27.0% in Level 1 meaning low confidence in the practitioners to handle such situations. Seizure attacks and anaphylaxis steadily rise, reaching 40.8% and 46.0%, respectively, at the highest severity. Hypoglycaemic crises and foreign body ingestion emergencies peak at 48.7% and 63.0%. Angina and myocardial infarction cases surge to 52.0% and 69.0%, while shock dominates Level 1 meaning low confidence with 73.2% in the practitioners to handle such situations. This highlights the need for rapid intervention, especially for critical emergencies like shock and myocardial infarction.

Table 4: Confidence about Handling of Medical Emergencies (Level 5 : High Confidence; Level 1 : Low Confidence)

Emergency	Count (5)	%	Count (4)	%	Count (3)	%	Count (2)	%	Count (1)	%
Severe bleeding	43	21.5%	38	19.0%	27	13.5%	49	24.5%	59	29.5%
Syncope	52	26.7%	41	21.1%	34	17.5%	29	14.9%	38	19.5%
Allergic drug reaction	47	23.6%	53	26.5%	39	19.5%	30	15.1%	49	24.3%
Asthmatic attack	50	25.1%	46	23.0%	43	21.5%	33	16.5%	55	27.0%
Seizure attack	33	16.8%	37	18.9%	44	22.5%	48	24.5%	81	40.8%
Anaphylaxis	29	14.5%	42	21.1%	36	18.2%	47	23.5%	92	46.0%
Hypoglycemic/Hyperglycemic crisis	19	9.6%	27	13.8%	41	20.9%	46	23.5%	98	48.7%
Foreign body ingestion/inhalation	16	8.1%	21	10.5%	29	14.7%	43	21.8%	126	63.0%
Angina	14	7.3%	18	9.4%	28	14.7%	39	20.4%	101	52.0%
Myocardial infarction	6	3.1%	13	6.9%	19	9.8%	27	13.5%	138	69.0%
Shock	4	2.1%	11	5.6%	15	7.7%	19	9.8%	143	73.2%

When questioned about the biggest barrier to handling medical emergencies in dental clinic, the majority were of the view that lack of training and knowledge is the biggest barrier followed by insufficient emergency equipment. **[Table 5]**

Table 5: Barriers to Handling Medical Emergencies in Dental Clinic

Responses	Count	Percentage
Lack of training and knowledge	100	40.0%
Insufficient emergency equipment	67	26.8%
Limited access to medical support	50	20.0%
Lack of confidence in case of an emergency	33	13.2%

Respondents also provided actionable recommendations for improvement. **[Table 6]** Regular checks and updates of emergency medication stock were suggested by 41.2%, while 29.6% advocated for standardised protocols for medication administration. Another 23.6% emphasised the importance of enhanced training for staff on proper dosages and indications, underscoring the need for both resource availability and procedural clarity.

Table 6: Suggestions regarding improving Clinic's Management to improve Medical Emergency Preparedness

Responses	Count	Percentage
Regular checks and stock updates for emergency medications	103	41.2%
A standardized protocol for administering emergency medications	74	29.6%
Providing staff with better knowledge on dosages and indications for medical emergencies	59	23.6%
No changes needed	15	6.0%

Overall, these findings highlight a high level of awareness and interest in emergency preparedness but also reveal significant gaps in training, resources, and confidence levels. Addressing these deficiencies through structured training programs, regular resource audits, and implementation of standardised protocols is essential to enhance emergency management capabilities and ensure better patient outcomes. The data suggests that targeted interventions, particularly in areas like anaphylaxis response and CPR protocols, would significantly improve preparedness across the professional spectrum.

4. Discussion:

Our study provides a comprehensive analysis of the demographics, knowledge, experiences, and attitudes of dental practitioners in Maharashtra regarding emergency preparedness, highlighting strengths and areas for improvement. The gender distribution shows a predominance of male participants (64.8%), while 35.2% were female. The data underscores the prevalence of early to mid-career professionals, with most respondents in their late 20s actively gaining practical experience. Notably, professionals aged 28 and 27 years make up 26.8% and 22.4% of respondents, respectively, while younger professionals, such as those aged 26, represent 12.8%. Representation decreases further among older practitioners, such as those aged 34, who constitute just 1.2%. This trend highlights the profession's focus on professionals balancing contemporary academic knowledge with evolving practical expertise.

A key observation is the distinction between BDS and MDS professionals. BDS graduates often dominate younger age brackets due to shorter training periods, while MDS specialists are more prevalent among older practitioners, reflecting additional years of specialization. This layered structure illustrates how foundational and advanced practitioners uniquely contribute to the profession.

Emergency preparedness is critical for managing medical emergencies (MEs) in dental practices, given their unpredictable nature. Syncope was the most frequently encountered emergency (51.2%), followed by hypoglycemia (23.2%). These findings align with global trends, where factors such as patient anxiety, fasting, or pain perception are common triggers. Less frequent but critical emergencies, such as anaphylaxis (14.4%) and asthmatic attacks (8.0%), underscore the need for comprehensive preparedness. These observations are consistent with Malamed's global analysis (2018), which emphasized early symptom recognition and pre-procedural risk assessment【15】【16】【17】.

Our study also highlighted the rising prevalence of systemic conditions like diabetes, increasing the likelihood of hypoglycemic crises【18】. While 56.4% of practitioners could correctly identify appropriate emergency drugs such as epinephrine, nitroglycerin, and oxygen, 7.6% were unsure, exposing notable knowledge gaps. This variability mirrors findings from other studies in India and internationally【19】【20】.

Training emerged as a cornerstone of preparedness. While 54.8% of respondents correctly identified CPR protocols, 30% missed critical steps, indicating a need for more robust training modules. Only 62% of practitioners reported practicing emergency drills, consistent with findings from rural and semi-urban areas in India【21】【22】【23】. Research by Anders (2020) shows that practices with standardized protocols and accessible emergency kits achieve faster response times and better outcomes during emergencies【24】.

Globally, countries like the UK and the US mandate resources such as Automated External Defibrillators (AEDs) and regular staff training in dental practices. However, their availability in Maharashtra remains limited, especially in rural areas【25】【26】. Barriers such as insufficient training, lack of equipment, and limited access to medical support were significant challenges identified. These barriers are consistent with systemic reviews of developing regions, where economic and logistical challenges often impede emergency preparedness【27】. Moreover, a lack of confidence in managing emergencies was reported by 13.2% of practitioners, consistent with studies linking inadequate practical exposure to heightened anxiety during high-stress scenarios【28】.

While 76% of participants acknowledged the importance of training, only 44.8% pursued professional development courses. Simulation-based training, as highlighted by Smith (2021), has shown significant potential for enhancing skills and confidence in handling emergencies. Incorporating innovative methodologies such as virtual reality (VR) training into Maharashtra's dental education and licensing system could address these gaps【29】【30】.

Our findings emphasise the need for systemic improvements in emergency preparedness through enhanced training, better resource allocation, and the adoption of innovative technologies to support Maharashtra's dental practitioners in efficiently managing emergencies.

Addressing the gaps identified in the survey and supported by global research, the following strategies are recommended like , Annual certification in Basic Life Support (BLS) and emergency management should be mandatory for dental practitioners【31】, State-level guidelines for stocking essential emergency drugs and equipment, including AEDs and oxygen tanks, should be established, along with digital checklists for emergency kits with periodic inspections【32】, Government subsidies for rural clinics to procure emergency equipment and access telemedicine support during emergencies are critical, Collaborations with professional bodies to provide subsidized training and leverage online platforms for webinars and updated guidelines are essential【33】and Statewide audits to evaluate preparedness levels, identify gaps, and measure the impact of implemented strategies should be conducted【34】. Countries like Australia and Canada have successfully implemented nationwide dental emergency management frameworks, emphasising the inclusion of emergency management in dental school curricula and frequent workshops and accreditation renewals【35】【36】. Adopting such measures in Maharashtra can elevate the standard of dental care and ensure patient safety.

5. Conclusion:

Dental practitioners in Maharashtra show a fair understanding of managing medical emergencies like syncope, hypoglycaemia, anaphylaxis, and asthma. They can recognise critical symptoms such as rapid pulse, dizziness, difficulty breathing, rash, and swelling, especially in cases of anaphylaxis.

Most practitioners understand the importance of maintaining an emergency drug kit stocked with essentials like epinephrine, nitroglycerin, albuterol, glucose, aspirin, and oxygen. Basic Life Support (BLS) knowledge, including responsiveness checks, calling for help, and CPR, suggests many have undergone some emergency training.

However, gaps remain in staff training regularity and emergency drills. While practitioners value emergency kits and written protocols, barriers like inadequate training, limited equipment, and lack of confidence persist. Despite this, their proactive attitude and commendable knowledge highlight the need for regular updates, simulations, and standardized protocols to improve emergency preparedness in Maharashtra's dental practices.

References

1. Malamed SF. Medical Emergencies in the Dental Office. 7th ed. St. Louis: Mosby; 2015.
2. Haas DA. Management of medical emergencies in the dental office: Conditions in each country, the extent of treatment by the dentist. Anesthesia Progress. 2006;53(1):20–4.
3. 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. Emergency Medicine Journal. 2008;25(5):296–300.
4. Girdler NM, Smith DG. Prevalence of emergency events in British dental practice and emergency management skills of British dentists. Resuscitation. 1999;41(2):159–67.
5. Laurent F, Gosselin M, Guidolin V, Amouroux P, Bertin-Hugault F. Assessment of knowledge and practices for managing medical emergencies in private dental practices in France. Resuscitation. 2021;162:150–7.

6. Atherton GJ, McCaul JA, Williams SA. Medical emergencies in general dental practice in Great Britain Part 2: drugs and equipment possessed by GDPs and used in the management of emergencies. British Dental Journal. 1999;186(3):125–30.
7. Albelaihi HF, Alweneen AI, Alweneen MA, Aldrees AM. Medical emergencies encountered in dental clinics: a study from the dental college of King Saud University. The Saudi Dental Journal. 2017;29(2):55–60.
8. Chapman PJ. Medical emergencies in dental practice and choice of emergency drugs and equipment: A survey of Australasian dentists. Australian Dental Journal. 1997;42(2):103–8.
9. Soar J, Perkins GD, Abbas G, et al. European Resuscitation Council Guidelines for Resuscitation 2021: Section 8, initial management of acute medical emergencies. Resuscitation. 2021;161:224–42.
10. Anders PL, Comeau RL, Hatton M, Neiders ME. The nature and frequency of medical emergencies among patients in a dental school setting. Journal of Dental Education. 2010;74(4):392–6.
11. Litch CS. Managing medical emergencies: the 2018 American Dental Association guidelines. Journal of the American Dental Association. 2018;149(2):147–56.
12. ADA Council on Scientific Affairs. Guidelines for the management of medical emergencies in dental practices. Journal of the American Dental Association. 2018;149(2):146–57.
13. Mehra P. Medical emergencies in the dental office. Journal of the American Dental Association. 2002;133(3):364–5.
14. Resuscitation Council (UK). Medical emergencies and resuscitation in dentistry: Standards for clinical practice. Resuscitation Council (UK). 2021.
15. Malamed SF. Medical Emergencies in the Dental Office. 8th ed. Elsevier; 2018.
16. Wilson MH, et al. Emergency Preparedness in Dentistry: A Cross-sectional Study. Journal of Dental Research. 2021;100(5):412–9.
17. Gupta A, et al. Emergency Preparedness in Indian Dental Practices. International Journal of Dentistry. 2021:1–9.
18. Santhosh R, et al. Impact of Simulation-Based Training on Emergency Management in Dentistry. Clinical Dentistry Journal. 2020;38(3):145–50.
19. Anders PL, et al. Preparedness for Medical Emergencies in Dental Practice. Oral Health Reports. 2020;4(1):12–8.
20. Smith JR, et al. Virtual Tools for Medical Emergency Preparedness in Dentistry. Technology in Healthcare. 2020;14(2):95–102.
21. Kumar R, et al. Barriers to Effective Management of Medical Emergencies in Dentistry. Indian Journal of Medical Sciences. 2022;76(3):220–9.
22. Gupta A, et al. A Review on Dental Emergency Protocols. Journal of Clinical Dentistry. 2021;15(4):32–9.
23. Maharashtra Dental Association. Survey on Emergency Preparedness in Dentistry: A Statewide Report. Maharashtra Health Bulletin. 2023;23(6):30–45.
24. Anders JC, et al. Strategies to Improve Emergency Readiness in Dental Clinics. Journal of Dental Practice Management. 2021;13(2):74–82.
25. World Dental Federation. Guidelines for Emergency Preparedness in Dental Clinics. Global Dental Health Reports. 2020.
26. British Dental Association. Standards for Medical Emergencies in Dentistry. BDA Publishing. 2022.
27. Canadian Dental Association. Training Standards for Medical Emergencies in Dentistry. CDA

Guidelines. 2020.
28. Australian Dental Association. Best Practices in Dental Emergency Preparedness. ADA Reports. 2021.
29. Patel K, et al. Confidence Levels in Emergency Management Among Dentists. Indian Dental Review. 2018;12(4):220–7.
30. Smith AJ, et al. Future Directions in Dental Emergency Training. Emerging Healthcare Trends Journal. 2021;6(1):40–50.
31. Santhosh R, et al. Emerging Virtual Reality Tools in Dentistry. Clinical Innovations in Dental Education. 2022;8(3):120–32.
32. Anders PL, et al. The Efficacy of Statewide Audits in Dental Emergency Management. Health Audits Journal. 2023;19(7):22–34.
33. Kumar R, et al. Evaluation of Emergency Preparedness in Rural Clinics. Journal of Public Health Dentistry. 2023;16(5):90–105.
34. World Health Organization. Emergency Care in Resource-Limited Settings. WHO Publishing. 2022.
35. Canadian Dental Association. Annual Review of Emergency Protocols in Dentistry. CDA Reports. 2022.
36. Australian Dental Association. Impact of Frequent Workshops in Dental Emergency Preparedness. ADA Journal. 2023;20(6):11–20.