

**Original Article****A Study to Assess Preparedness of Dental Clinics for Medical Emergencies in Nepal****Pawan Mehta<sup>\*1</sup>, Amit Kumar Singh<sup>2</sup>, Anil Kumar Yadav<sup>3</sup>**

<sup>1</sup>Department of Prosthodontics, <sup>2</sup>Department of Conservative Dentistry and Endodontics Nobel Medical college and Teaching Hospital, Biratnagar, Nepal, <sup>3</sup>Department of Orthodontics, Madhesh Academy of Health Sciences, Janakpurdham, Nepal

Article Received: 12<sup>th</sup> September, 2024; Accepted: 8<sup>th</sup> December, 2024; Published: 31<sup>st</sup> December, 2024

**DOI:** <https://doi.org/10.3126/jonmc.v13i2.75004>

**Abstract****Background**

A medical emergency is an unwanted, unexpected reaction or complication. Effective management of an emergency situation in the dental office is ultimately the dentist responsibility.

**Materials and Methods**

A descriptive study was carried out. Data were collected using a pre-tested structured close-ended self-administered questionnaire. 465 general and/or specialist dental practitioner were selected from the registered member of Nepal Dental Association. Data entry and descriptive statistics analysis was done using Statistical package for social science version 26.


**Results**

The results of the study show that the preparedness of dental clinics for medical emergencies was unsatisfactory. Only 47.1% of clinics have emergency kit and 33.8% have oxygen cylinder.

**Conclusion**

The study shows that the dental clinics preparedness for medical emergency was not satisfactory and nearly half of the participants have knowledge on managing medical emergency at dental clinics.

**Keywords:** *Dental clinics, Dentist, Emergencies*

	©Authors retain copyright and grant the journal right of first publication. Licensed under Creative Commons Attribution License CC - BY 4.0 which permits others to use, distribute and reproduce in any medium, provided the original work is properly cited.	<b>*Corresponding Author:</b> Dr. Pawan Mehta Assistant Professor Email: <a href="mailto:pawanmehta129@gmail.com">pawanmehta129@gmail.com</a> ORCID: <a href="https://orcid.org/0000-0003-3998-0897">https://orcid.org/0000-0003-3998-0897</a>
-------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Citation**

Mehta P, Singh AK, Yadav AK, A Study to Assess Preparedness of Dental Clinics for Medical Emergencies in Nepal, JoNMC. 13:2 (2024) 88-92. DOI: <https://doi.org/10.3126/jonmc.v13i2.75004>



## Introduction

Medical emergencies are not uncommon in dental clinics. Dentists and their staff should be well-skilled and trained. The Nepal Medical Council (NMC) has added mandatory module of 10 credit points on 'Medical Emergencies in Dental Practice and Practice Management' as most dental practices are located outside hospital settings, where medical emergency backup may not be available [1]. The American Dental Association (ADA) has set guidelines for the preparedness of dental offices, which include training all staff members, who should also be updated in Cardiopulmonary Resuscitation (CPR) [2].

Studies have shown that preparedness of the surveyed clinics and dental teams to manage medical emergencies is unsatisfactory [3-6]. Studies conducted in Nigeria showed a lack of adequate preparation for emergencies in government-owned dental clinics in Lagos State [4]. Similar studies in Brazil, India, and Nigeria concluded that the preparedness of the surveyed clinics and dental teams to manage medical emergency situations is unsatisfactory [3-6].

Dentists should also be familiar with accepted treatments and protocols for medical emergencies, as these often form the basis for legal standards of care. This study aims to assess preparedness of dental clinics for medical emergencies, focusing primarily on the availability of medical emergency drugs at dental clinics.

## Materials and Methods

A descriptive cross-sectional study was designed and conducted among dental surgeons and specialist practitioners who are registered in the Nepal Medical Council and member of Nepal Dental Association, all currently working in registered dental clinics in Nepal. The study was conducted from February 2024 to September 2024. The ethical approval for the study was obtained from IRC of Nobel Medical College with reference number 09/2024. Written informed consent was obtained from all the participants, and the procedures, purpose, expected outcomes, participants' responsibilities, risks and benefits, and confidentiality of the research, were clarified.

The sample size formula  $\{Sample\ size = Z^2 p(1-p)/c^2\}$  was used for sample size collection, where  $Z = 1.96$  at 95% CI,  $p =$  prevalence of dentist

prepared for medical emergencies,  $c =$  margin of error,  $N =$  Sample population size. At 92.7% prevalence of dental practitioner [4] to improve medical emergency preparedness according to study by Joshi S. and Acharya S (2015) 95% confidence level and 3% margin of error, the sample size of 314 was adequate for our study. We took total 465 study participants in our study. The simple random sampling technique was used to enroll 465 participants among 2171 total selected population, including registered dentists and specialist dental practitioners registered in the Nepal Medical Council and the Nepal Dental Association, all currently working in registered dental clinics in Nepal. The selected samples were asked to complete a self-administered, structured questionnaire regarding preparedness for medical emergencies, along with demographic details. The data collection tool was divided into two parts. Part I consisted of 6 questions related to socio-demographic variables, including gender, age, education level, professional rank, specialist status, area of practice, and years of experience. Part II contained 10 questions on self-assessed medical emergency preparedness. All questions in Part II, except for question 9, were multiple-choice questions with a single answer, and 7 questions focused on medical emergencies with multiple response options. Pre-testing of the data collection tool was conducted on 10% of the sample. Data entry and descriptive statistics analysis was done using Statistical package for social science version 26.

## Results

The total participants of the study were 465; of which 51.4% were between 20-30 years age, 40.9% were of 30-40 years age and 7.5% were of 40-50 years age. The male and female participants were 45.6% and 54.2% respectively. 62.4% were BDS degree holder and 34.6% were MDS. 64.9% were general dental practitioner and 34.6% were Specialist practitioner. 45.6% were from Bagmati Province, 12.9% from Madhesh, 13.5% from Koshi, 13.1 from Lumbini, 8.4% from Gandaki, 3% from Sudurpaschim and 3.4% from Karnali province. More than half of the participants were having less than 5 years of practice. The content similarity index was calculated and found to be above 90%. The reliability of the tool was assessed using Cronbach's

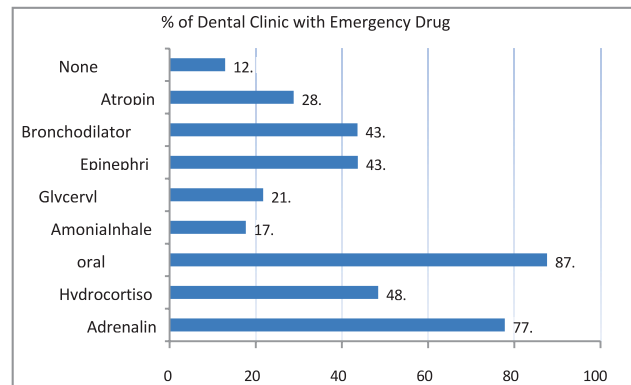


Alpha, which was found to be 0.93.

**Table 1: Demographic variables of the respondents**

Demographic variables		Frequency	Percent
Age	20-30Years	239	51.4
	30-40Years	190	40.9
	40-50Years	35	7.5
	50-60Years	1	.2
Gender	Male	212	45.6
	Female	252	54.2
	Other	1	.2
Professional qualification	BDS or Equivalent	290	62.4
	MDS or Equivalent	161	34.6
	PhD or Equivalent	1	.2
	PG	13	2.8
Professional Rank	General Dental Practitioner	302	64.9
	Specialist Practitioner	163	35.1
Area of practice	KoshiProvince	63	13.5
	Madhesh Province	60	12.9
	Bagmati Province	212	45.6
	Gandaki Province	39	8.4
	Lumbini Province	61	13.1
	KarnaliProvince	16	3.4
	SudurpaschimProvince	14	3.0
Years of practice	<5Years	265	57.0
	5-10Years	119	25.6
	10-15Years	56	12.0
	15-20Years	18	3.9
	>20Years	7	1.5

Almost all (96.6%) of the participants enquired about medical history only 62.4% obtained a filled health history proforma. About (27.5%) of the participants did not obtain vital signs before commencing any treatment. Half of the participants (46%) have not attended any workshop or training on emergency management. Only 43% of the participants can handle emergency condition in the dental clinics, nearly half (47.1%) has emergency kit at dental office. 84.1% of the participants can give intramuscular injection whereas only 38.5% can give intravenous injection. Only one third (33.8) of dental clinics have oxygen cylinder in their practice center. Oral glucose was available in 87.6%, adrenaline in 77.8%, hydrocortisone in nearly half 48.4%, epinephrine in 43.7%, bronchodilator spray in 43.6, glycerol trinitrate in 21.7, ammonia inhalant in 17.7%. 12.9% of the respondents did not choose to answer.



**Figure 1: Emergency drugs available at dental clinic**

**Table 2: Self-assessed medical emergency preparedness**

	Self-assessed medical emergency preparedness			
	Don't Know	No	Yes	None Response
Do you enquire about medical history including medication and allergy?	Frequency	4	12	499
	Percent	9	2.6	96.6
Do you obtain filled health history proforma of the above from the patients?	Frequency	15	160	290
	Percent	3.2	34.4	62.4
Do you obtain the vital signs (blood pressure, pulse, respiration, temperature) of patients? before commencing any treatment?	Frequency	6	128	331
	Percent	1.3	27.5	71.2
Have you attended any work shop on emergency training or management programs?	Frequency	7	218	240
	Percent	1.5	46.0	51.6
Do you think you can handle any emergency condition at your dental office?	Frequency	133	132	200
	Percent	28.6	28.4	43
Do you have availability of emergency kits at dental office?	Frequency	28	218	219
	Percent	6	46.9	47.1
Can you give an intramuscular injection?	Frequency	14	60	391
	Percent	3	12.9	84.1
Can you give an intravenous injection?	Frequency	48	238	179
	Percent	10.3	51.2	38.5
Availability of oxygen at your practice center.	Frequency	21	287	157
	Percent	4.5	61.7	33.8

## Discussion

Medical emergencies are not uncommon in dental clinics. Dentist and the staffs should be well skilled and trained. The clinics should be well equipped with emergency drugs and equipment. Medical emergencies can occur in the dental clinic during dental treatment with events such as loss of consciousness/vasovagal syncope, adverse reaction to local anesthesia, choking, asthmatic attack and seizures being some of the commonly reported events [8,9]. Medical emergencies in dental practice in Nepal are considerable and not as rare as anticipated. Majority of the events occur during oral surgical treatment. The most frequently encountered emergency situation is vasovagal syncope followed by hypoglycemia and seizures. 37.1% of dentists



encountered at least one emergency situation [10]. In the USA, 17 out of 25 deaths at the dental clinic between 1980 and 2011 were related to the sedation anesthetic [11, 12].

The American Dental Association (ADA) [2] had set guidelines for the preparedness of the dental office, which includes: training of all staff members, who also should be updated in Cardiopulmonary resuscitation (CPR). Emergency drills must be done; the contact numbers of appropriately trained emergency care providers must be known and mounted clearly and the emergency drug kit and equipment must be available in the clinic and checked periodically. Emergency drug kit must contain the following as minimum: histamine-blocker (injectable), epinephrine 1:1000 (injectable), nitroglycerin, bronchodilator, glucose, aspirin and oxygen with positive-pressure, especially considering the fact that the most important part for managing almost all medical emergencies in dentistry is to eliminate hypoxia of the brain or heart [2,13] Developing an action plan in advance for managing medical emergency on the dental chair along with familiarizing all dental staff with the action plan to know their tasks in an emergency, are crucial in an emergency management [13,14]

Studies have shown that preparedness of the surveyed clinics and the dental team to manage medical emergencies situations are unsatisfactory [3-6]. There should be a mandatory periodic lecture given to the dentists after graduation, and lastly, the clinic must be prepared optimally to handle all the emergencies and there should be a stricter monitoring of the clinics by the health authorities to make sure they are equipped flawlessly [15]. Dentists have the responsibility of recognizing medical emergencies when they arise, along with should be competent in managing medical emergencies optimally.

The results of the study showed 43% of the participants can handle emergency condition in the dental clinics. Similar findings were found by Baduni et al. (2015) [14]; Hassan et al. (2019) [15].

The results of the study showed nearly half (47.1%) has emergency kit at dental office. Only one third of dental clinics have oxygen cylinder in their practice center. The findings are in contrast to study by Baduni et al. (2015) found that only 22% had all the necessary emergency drugs and equipment in their clinics. The lack of mandatory training programs and the high cost of emergency equipment were identified as significant barriers to adequate preparedness. This study

highlighted the need for better training and resource allocation to improve emergency preparedness in dental clinics [14]. The results are in accordance to the study by Hassan et al. (2019) [15]; Arsati et al. (2010) [10]; Al Ghanamet al. (2009) [16].

The study by Hassan et al. (2019) [15] stated essential emergency equipment, such as oxygen cylinders and defibrillators, was often absent. The researchers pointed out that dental education curriculums in Pakistan did not emphasize emergency preparedness sufficiently, contributing to the gap in knowledge and skills among practitioners. This underscores the need for incorporating emergency management training in dental education and ensuring the availability of essential equipment [15]. The study by Arsati et al. (2010) [10] also identified that many practitioners were aware of the need for training but cited a lack of available courses and high costs as barriers. The findings indicate a need for more accessible and affordable training programs to enhance emergency preparedness [3].

In Jordan, Al Ghanam et al. (2009) study highlighted the urgent need for comprehensive policies and continuous professional development programs to improve emergency preparedness in dental practices and ongoing training and regular updates to emergency protocols are crucial for maintaining preparedness [16]. In contrast, a study by Atherton et al. (2010) [2] in the UK found 90% of dental practices had a written emergency protocol, and over 80% of the staff had received training in emergency management within the past year; 95% of dental practices had emergency kits, and 92% of the staff received regular training in emergency protocols respectively. Nearly all practices had access to emergency drugs and equipment. The high level of preparedness in the UK and USA can be attributed to the regulatory requirements set by the General Dental Council (GDC), which mandates that dental professionals undergo continuous professional development, including emergency management training [8]. The high level of preparedness was attributed to stringent regulatory requirements by organizations such as the American Dental Association (ADA), which provides guidelines and resources for emergency preparedness. Furthermore, the availability of resources and funding in the U.S. supports the maintenance of well-equipped dental clinics [17].

Chapman et al. (2011) [17] in Australia found that 85% of dental practices conducted regular emer-



gency drills, and 88% had all the required emergency drugs and equipment. The study emphasized the role of regulatory bodies in ensuring compliance and preparedness. The Australian Dental Association (ADA) provides extensive guidelines and conducts regular audits to ensure that dental practices are equipped and trained to handle medical emergencies effectively [17]. These comparisons underscore the disparity in emergency preparedness between dental practices in low- and middle-income countries versus those in high-income countries. The primary factors contributing to this disparity include differences in regulatory frameworks, availability of resources, and emphasis on continuous professional development. The findings from Nepal reflect a broader issue seen in similar contexts, where the lack of mandatory training programs, insufficient resources, and inadequate regulatory enforcement hinder effective emergency preparedness in dental practices. This study has important limitations. The study was conducted among participants registered in NDA and working in registered dental clinic in Nepal. There are many dental practitioners not registered in NDA. There are many dental clinics are in our country with no registration or registration not renewed where dentist and specialist dentist are working. So, the results may not reflect those participants. Another important limitation is that this study used self-administered data collection tool, the reliability of the data depends on how correct the questions were answered. Large scale studies incorporating all the practicing dental surgeons and specialist in Nepal with direct interview and field visit are desirable in the future to assess the overall scenario that represents the true situation existing in Nepal.

### Conclusion

Majority of the participants were of 20-40 years of age, with almost half of the respondents from Bagmati province. Majority of the respondents cannot handle emergency condition in their dental clinic. Half of the clinics have emergency kit and one third of clinics have oxygen cylinder. All the emergency medication was not present in most of the clinics.

**Acknowledgement:** None

**Conflict of interest:** None

### References

- [1] Nepal Medical Council, Continuing professional development of NMC: Frequently asked questions, [Internet]: <https://nmc.org.np/continuing-professional-development-of-nmc-frequently-asked-questions>. (Accessed 22.09.05 October 2024).
- [2] Atherton GJ, McCaul JA, Williams SA, Medical emergencies in general dental practice in Great Britain Part 1: their prevalence over a 10-year period, *Brit Dent J.* 186:2 (1999)72-9. DOI: 10.1038/sj.bdj.4800023
- [3] Greenwood M, Medical emergencies in the dental practice, *Periodontology* (2000). 46:1 (2008). DOI: 10.1111/j.1600-0757.2008.00230.x
- [4] Joshi S, Acharya S, Medical emergencies in dental practice: A Nepalese study, *Orthod J Nepal.* 5:2 (2016)33-37. DOI:10.3126/ojn.v5i2.15223.
- [5] Chicka MC, Dembo JB, Mathu-Muju KR, Nash DA, Bush HM, Adverse events during pediatric dental anesthesia and sedation: A review of closed malpractice insurance claims, *Pediatr Dent.* 34:3 (2012) 231–238. PMID: 22795157
- [6] Malamed SF, Knowing your patients, *J Am Dent Assoc.* 141:Suppl 1(2010) S3-S7. DOI:10.14219/jada.archive.2010.0350.
- [7] Rosenberg M, Preparing for medical emergencies: the essential drugs and equipment for the dental office, *J Am Dent Assoc.* 141:Suppl 1 (2010) S14-9. DOI:10.14219/jada.archive.2010.0351
- [8] Haas DA, Preparing dental office staff members for emergencies, *J Am Dent Assoc.* 141:Suppl 1 (2010) 8S-13. DOI:10.14219/jada.archive.2010.0352.
- [9] Maryam A, Atessa P, MozafariPegah M, Medical risk assessment in patients referred to dental clinics, *Open Dent J.* 23:9 (2015)420–25. DOI:10.2174/1874210601509010420.
- [10] Arsati F, Montalli VA, Florio FM, Brazilian dentists' attitudes about medical emergencies during dental treatment, *J Dent Educ.* 74:6 (2010) 661–66. DOI: 10.1002/j.0022-0337.2010.74.6.tb04912.x
- [11] Gbotolorun O, Babatunde L, Osisanya O, Omokhuale E, Preparedness of government-owned dental clinics for the management of medical emergencies: A survey of government dental clinics in Lagos, *Niger Q J Hosp Med.* 22:4 (2012) 263–67. PMID: 24568061
- [12] Kumarswami S, Tiwari A, Parmar M, Evaluation of preparedness for medical emergencies at dental offices: A survey, *J Int Soc Prev Community Dent.* 5:1 (2015)47–51. DOI:10.4103/2231-0762.151977.
- [13] Al-Hassan M, AlQahtani S, Preparedness of dental clinics for medical emergencies in Riyadh, Saudi Arabia, *Saudi Dent J.* 31:1 (2019) 115–121. DOI:1016/j.sdentj.2018.11.006.
- [14] Baduni N, Prakash P, Srivastava D, Sanwal MK, Singh BP, Awareness of basic life support among dental practitioners, *Natl J Maxillofac Surg.* 5:1 (2014) 19-22. DOI: 10.4103/0975-5950.140159.
- [15] Hassan SH, Shah I, Azhar M, Farooq M, Maqsood M, Mubeen T, Management of medical emergencies in dental practices-an audit, *Pak Armed Forces Med J.* 61:4 (2011)602-05.
- [16] Al Ghanam MA, Khawalde M, Preparedness of Dentists and Dental Clinics for Medical Emergencies in Jordan, *Mater Sociomed.* 34:1 (2022) 60-65. DOI:10.5455/msm.2022.33.60-65.
- [17] Chapman PJ, Medical emergencies in dental practice and choice of emergency drugs and equipment: a survey of Australian dentists, *Aust Dent J.* 42:2 (1997) 103-8. DOI:10.1111/j.1834-7819.1997.tb00104.x.

