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Assessment of preparedness of dental clinics for medical emergencies

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Abstract
Introduction: Medical emergencies are inevitable in clinical dental set-up. They put the well-being of patients at risk. If addressed properly, severity of such episodes can be brought down significantly. So the aim of this study was to assess the preparedness of dental Practitioners to manage medical emergencies in dental clinics.
Materials and Method: This cross-sectional survey was done among 150 graduate and postgraduate Practitioners. The participants filled self-administered questionnaire consisting of 23 close-ended questions. Descriptive analysis using Chi-square test was done to compare two groups. P-value of <0.5 was considered as statistically significant.
Result: Amongst 150 participants, around three-fourth of study participants have encountered medical emergency during clinics. Around three-fourth of Practitioners has received theoretical training but still majority of participants feel they are incompetent to handle medical emergencies. Most of them are willing to undergo proper training to handle medical emergencies and also support the addition of separate ALS and BLS course. Majority of PGs and three-fourth graduates knew how to perform BLS, CPR but administration of IM, IV and SC injections were known to less than one-third of Practitioners.
Conclusion: Dental professionals should be confident and prepared to deal with medical emergencies arising during their practice. Reforms in dental curriculum and thorough training of dental Practitioners at an initial stage will help to increase their confidence and competence to deal with medical emergencies.

Keywords: Medical emergencies, dental interns and PGs, competence, curriculum

Introduction
Medical emergencies are inevitable in clinical dental set-up. They put the well-being of patients at risk. These emergencies present critical scenario which should be the lack of ability to handle medical emergencies among dental professionals can be attributed to the Curriculum which fails to provide professionals with adequate training required to tackle such situations. Though texts regarding "handling of medical emergencies" are presented to the dental professionals, but they fail to inculcate the required skill as these are taught only superficially without thorough practical training [7]. Thus, making the professionals less confident to handle medical emergency. If addressed properly, the severity of such episodes reduce by remarkable degree. Thus, this study aims to assess the preparedness of dental professionals to manage medical emergencies in dental clinics. Basic life support (BLS) is the foundation for saving life following cardiac arrest. Fundamental aspects Of BLS include recognition of sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition [1] and response to heart attack and stroke are also considered part of BLS. Basic life support (BLS) also includes supporting breathing, circulation and maintaining an airway without using any equipment other than a simple airway device or protective shield. The Knowledge of BLS and expertise in CPR techniques ensures the survival of the patient long enough till experienced medical help arrives and in most of the cases is itself sufficient for survival [4]. Different factors may affect the quality of CPR; such as feedback, education and monitoring and it has been emphasized that these should be developed together in order to improve quality.

Materials and Methods

The descriptive, cross-sectional survey was carried out among 150 professionals, which included graduates and post graduate professionals of dental college in South India. It assessed the knowledge, attitude and competence to handle medical emergencies in clinical setup among dental professionals. The study population was selected as they handle more number of patients in the clinics and have been taught about medical emergencies and its management as a part of their curriculum. The participation was voluntary and the identity was kept confidential. Informed consent was obtained prior to filling the questionnaire. Before conducting study, permission was sought from Head of the Institute. Ethical clearance was also obtained from Institutional Ethical Committee. A self- administered questionnaire consisting of 23 close-ended questions spread out over 3 sections was used. The demographic details of participants were also collected. First section comprised of 9 questions dealing with knowledge about medical emergencies among dental professionals. The second section comprised of 6 questions regarding attitude towards handling of medical emergencies. A 5-point Likert scale was used to assess the response of participants. Last section had 8 questions assessing self-perceived competence of participants about basic procedures that aid in handling medical emergencies. The data collected was subjected to descriptive analysis using SPSS version 20. Chi-square test was used to compare two groups and p-value of <0.5 was considered as statistically significant.

Results

In Table 1: Amongst the one fifty participants, 85 were undergraduate and 59 were post - graduates (PGs). Ph.D. holder are about 1 and other additional degree/diploma holder where about 5Approximately two-third of participants were female in both the groups.

In Table 2: demonstrates the knowledge of dental professionals towards handling of medical emergencies. Most of the participants strongly agreed that all dental professionals should be well versed with knowledge of handling medical emergencies. Around 90% of participants were in favour of addition of a separate ALS and BLS programme to the present dental curriculum. Around 93% professionals known the full form of BLS. Recording of vitals and thorough medical history before any dental procedure has been strongly agreed upon by approximately 90% Professionals.

In Table 3: shows the self-perceived competence about few basic procedures that aid in handling medical emergencies among the participants. Around three fourth practitioners knew how to perform BLS, CPR and artificial respiration. Even though, majority of study population has received theoretical training for handling medical emergencies but only around one-fourth of study population has practical training for handling medical emergency. Majority of the participants 6.6% have inadequate training to handle medical emergencies and the major cause for this inadequacy was lack of time. Most participants 86.6% were willing to undergo proper training to handle medical emergencies.

About 86.6% dental practitioners strongly agree that medical history should be recorded prior to any important treatment.

About 16% knew administration of intramuscular injection, and 83% didn't knew. A higher percentage (76.8%) of PGs knew how to check carotid pulse as compared to the undergraduates (59%) and this difference was statistically significant (p-value = 0.023).

In Table 4: illustrates practice of dental practitioner about handling of medical emergencies, where majority of participants 91% knew how to diagnose medical emergency. A significantly 80% knew that adrenaline can be used as an emergency drug in case of anaphylaxis. Although, approximately 130 number of participants have encountered syncope as medical emergency in clinics, only 86.6% knew to place the patient in Trendelenburg position and ammonia inhalation as a rescue solution.

Table 1: Demographic characteristics of the participants (N = 150)

Sr. No.	Particulars	Responses	Number (N)	Percentage (%)	Total N (%)
1	Qualification	UG	85	56.66	150 (100%)
		PG	59	39.3	
		PhD	1	0	
		additional degree/diploma	5	3.33	
2	Address	Rural	79	52.66	150 (100%)
		Urban	71	47.33	
3	General dental service	<1 years	3	2	150 (100%)
		1-2 years	69	46	
		2-5 years	65	43.33	
		More than 5 years	13	8.66	

Table 2: Knowledge and awareness related questions (N = 150)

Sr. No.	Questions	Responses	Number (N)	Percentage (%)	Total N (%)
1	Do you know the full form of BLS?	Best Life Support	5	3.33%	150 (100%)
		Basic Life Support	140	93.3%	
		Basic Lung Support	0	0%	
		Basic Life Services	5	3.33%	
2	Are you aware of the medical emergencies faced in dental clinics?	Yes	150	98	150 (100%)
		No	3	2	
3	Have you ever faced an emergency situation in your dental clinic?	Yes	74	49.33	150 (100%)
		No	76	50.66	
4	If yes, what kind of?	**Diabetic crisis:** hypoglycaemia hyperglycemia diabetic coma	70	46.66	150 (100%)
		Respiratory distress: asthma status asthmaticus inhaled foreign body	15	10	
		Cardiac arrest: Stroke angina pectoris myocardial infarction	10	6.66	

		Drug reaction: anaphylaxis acute steroid insufficiency	30	20	
		Fits/Seizures	25	16.66	
		Other (please state)			
5	Where did the event occur?	Surgery unit/minor operation theatre/surgical assistance area	65	43.33	150 (100%)
		Waiting room of dental clinic	10	6.66	
		Dental chair	70	46.66	
		While consultation	5	3.33	
6	At what stage of the treatment did the event occur?	Before treatment	10	6.66	150 (100%)
		After anesthesia	27	18	
		During the procedure	110	73.33	
		After the procedure	3	2	
7	Do you know how to diagnose medical emergencies?	Yes	150	98	150 (100%)
		No	3	2	
8	Do you know how to perform cardio pulmonary resuscitation?	Yes	80	53.33	150 (100%)
		No	70	46.66	
9	What is the location of chest compression?	Left side of the chest	5	3.33	150 (100%)
		Mid chest	120	80	
		Right side of the chest	5	3.33	
		Xiphisternum Ratio of Car	20	13.33	
10	Do you know how to give an intramuscular / intravenous injection?	Yes	25	16	150 (100%)
		No	125	83.33	
11	What emergency drugs should be available in a dental clinic? (please tick)	Adrenaline	30	20	150 (100%)
		Glucose	105	70	
		Diazepam	5	3.33	
		Steroid	7	4.66	
		Nitrous oxide	3	2	
		Other(please specify)			
12	What emergency equipment you carry in your practice? (please tick)	Defibrillator	2	1.33	150 (100%)
		ECG monitor	0	0	
		Oxygen breathing apparatus for delivering air	3	2	
		Aspirator	5	3.33	
		Torniquet	10	6.66	
		Disposable syringe/ needle	130	86.66	
13	If, A- Airway B- Breathing C- Circulation D- Definitive care P- Position What should be the approach to handle emergency?	B-A-C-D-P	10	6.66	150 (100%)
		A-B-C-D-P	30	20	
		P-A-B-C-D	80	5.33	
		D-P-A-B-C	30	20	
14	Do you know how to record the blood pressure and blood glucose level of the patient?	Yes accurately	123	82	150 (100%)
		Yes but not accurately	10	6.66	
		No, I don't know	3	2	
		I don't keep apparatus for measuring them	14	9.33	
15	Are you aware about of the National Institute Of Health Care Excellence's Guidelines for Medical Emergency Management in dental practice	Yes	140	93.33	150 (100%)
		No	10	6.66	

Table 3: Attitude related questions (N = 150)

Sr. No.	Questions	Responses	Number (N)	Percentage (%)	Total N (%)
1	Have you attended any workshop on emergency training or management programs	YES	120	80	150 (100%)
		NO	30	20	
2	If yes, do you think that management program prepared you to manage medical emergencies?	Strongly agree	10	6.66	150 (100%)
		Agree	80	53.33	
		Neutral	50	33.33	
		Disagree	5	3.33	
		Strongly disagree	5	3.33	
3	Do you think obtaining vital signs before commencing the procedure important	Strongly agree	50	33.33	150 (100%)
		Agree	60	40	
		Neutral	20	13.33	
		Disagree	10	6.66	
		Strongly disagree	10	6.66	
4	Do you think recording medical history prior treatment important?	Strongly agree	130	86.66	150 (100%)
		Agree	14	9.33	
		Neutral	6	4	
		Disagree	0	0	
		Strongly disagree	0	0	
5	Do you think you can handle an emergency situation in you dental clinic?	Strongly agree	25	16.66	150 (100%)
		Agree	15	10	
		Neutral	90	60	
		Disagree	20	13.33	
		Strongly disagree	10	6.66	
6	Do you think your team members are trained	Strongly agree	10	6.66	150 (100%)

	enough to handle a emergency situation?	Agree	30	20	
		Neutral	80	53.33	
		Disagree	20	13.33	
		Strongly disagree	10	6.66	
7	Do you think any prior arrangements with a general physician to obtain assistance in event of an emergency in dental office should be made?	Strongly agree	110	73.33	150 (100%)
		Agree	30	20	
		Neutral	10	6.66	
		Disagree	0	00	
		Strongly disagree	0		
8	Do you think it is necessary for dental courses to include training for medical emergencies for the undergraduates?	Strongly agree	130	86.66	150 (100%)
		Agree	10	6.66	
		Neutral	10	6.66	
		Disagree	0	0	
		Strongly disagree	0	0	

Table 4: Practice related questions (N = 150)

Sr. No	Questions	Responses	Number (N)	Percentage (%)	Total N (%)
1	A patient suffered from syncope when you commenced a dental procedure what would be your immediate action	Continue dental procedure	0	0	150 (100%)
		Place the patient in Trendelenburg position and give ammonia inhalant	130	86.66	
		Make patient sit in upright position	20	13.33	
		Make patient stand	0	0	
2	If a patient during the treatment undergoes hypoglycemic/hyperglycemic shock what would be your immediate action	Wait and observe	10	6.66	150 (100%)
		Provide glucose	130	86.66	
		Continue the treatment	3	2	
		Get the patient in Trendelenburg position	7	4.66	
3	In case of epilectic fits on dental chair you would	Continue dental procedure	0	0	150 (100%)
		Inject diazepam	35	23.33	
		Make patient lie in lateral position	5	3.33	
		Wait and observe	110	73.33	
4	Drug of choice in anaphylaxis	corticosteroids	5	3.33	150 (100%)
		Adrenaline	120	80	
		vasodilator	10	6.66	
		Antihistamines	15	10	
5	A patient undergoes sudden loss of consciousness absent pulse and loss of breathing what would be your treatment of choice	Perform Cardiopulmonary resuscitation	120	80	150 (100%)
		Carry out defibrillation	5	3.33	
		Make patient lie in lateral position	20	13.33	
		Inject diazepam	5	3.33	
6	A patient is cited with airway obstruction during dental treatment due to aspiration of foreign body, what would you do?	Attempt Heimlich/ triple maneuver	50	33.33	150 (100%)
		Examine mouth and local area	40	26.66	
		Ask patient to cough	20	13.33	
		All of the above	40	26.66	
7	What special care would you take in case a pregnant (2^{nd} / 3^{rd} trimester) visits your clinic for a dental treatment?	Delay elective procedures	45	30	150 (100%)
		Continue with normal procedures	100	66.66	
		Alter antibiotics armamentarium	5	3.33	
		No special care is needed	0	0	
8	How do you plan for any dental procedure in a morbid (high risk) patient?	Advise antibiotic prophylaxis	10	6.66	150 (100%)
		Ask patient to stop ongoing medications	10	6.66	
		Advise patient to take consent from a general physician	120	80	
		Carry out normal procedure	10	6.66	
9	If a known case of hypertension comes to your clinic for an extraction what preventive measures would you consider before the treatment?	Keep nifedipine handy	5	3.33	150 (100%)
		Avoid adrenaline containing medications	135	90	
		Inform patient well about the procedure to reduce anxiety	7	46.66	
		All of the above	3	2	
10	If you confirm somebody is not responding even after shaking and shouting at them what will be your immediate action?	Start CPR	90	60	150 (100%)
		Activate emergency medical services	30	20	
		Put him in recovery position	20	13.33	
		Wait and observe	10	6.66	
11	How do you give rescue breathing to infants?	Mouth to mouth with nose pinched	10	6.66	150 (100%)
		Mouth to mouth and nose	110	73.33	
		Mouth to nose only	10	6.66	
		Mouth to mouth without nose pinched	20	13.33	

Discussion

During dental procedures, medical emergencies have been frequently reported. Dental graduates and post graduates have to deal with large number of patients and are likely to encounter medical emergencies during their practice. Although, according to a study upto 93.33% of dentists may encounter a medical emergency in a year the present study shows that around three-fourth of the study participants have encountered medical emergency during their practice. According to the Mostafa Alhamad, Talib alnahwi and Muhammad A. Nazir. study was conducted on 145 dentist.

The study shows that about 67% of practitioner have encountered episode of medical emergency.

According to our study 46.66% cases where of diabetic crises and followed by 10% cases with respect to foreign body inhalation, same study was conducted by the Mostafa Alhamad, Talib alnahwi and Muhammad A Nazir. Study was conducted on 145 dentist 44% of cases was encountered of hypoglycaemia and 5.5% of cases where of foreign body inhalation.

About 83.33% participant don't know how to give intramuscular/intravenous injection according to our study. according to study performed by Franco Arsati, victor angelo montalli on 498 clinicians 62.4% of participants don't know how to give intramuscular / intravenous injection.

49.33% of150 participants had faced an emergency situation in their dental clinic and 50.66% participant did not same study was conducted by Maan ahmad sheikh, Faisal hamad alyahya, fahad alhussain alzahrani only 46.4% of participant have faced experience medical emergency.

according to our study 52% participants where practicing in rural areas and 47% where practicing in urban areas same according to study performed by 43% of participants where practicing in small towns and 34% in large cities.

Also, significantly higher number of pgs has knowledge about emergency drugs and materials precipitating allergic reactions in patients, as compared to undergraduates. This can be attributed to the higher level of clinical experience and expertise of pgs. Although, the result of this study shows that pgs are better trained and more confident about handling of medical emergencies as compared to undergraduates, still both the groups lack adequate skill, training and knowledge to handle medical emergencies efficiently. In the present study, though most of participants have received theoretical training t handle medical emergency, but they lack practical training. (A study conducted by Ehigiator *et al*. [9] among Nigerian dental professionals showed that 8.1% of the participants had received only practical training, 21.8% had received only theoretical training, 28.2% had received both type of training whereas 41.9% had received no training at all. This could be one of the reasons for the lack of understanding and ability to handle medical emergency. Also, a study by Shenoy *et al*. [8] showed poor understanding of medical emergencies among young dental graduates of dental school and hospital in Mangalore. Birang *et al*. in their study showed that the knowledge score of Esfahan dentists was 5.42/10. Jodalli *et al*. stated that although theoretical training has been received by the study group but they are not confident to treat emergencies and may require further practical training. Result of various studies suggest revision of dental curriculum to lay more and equal amount of emphasis on both theoretical and practical training. This study showed that the self-perceived competence of participants regarding the common procedures like BLS, CPR and artificial respiration was good but it was not of an acceptable level when discussing about procedures like IM, IV and SC injection administration. A study by Shenoy *et al*. [8] showed that only 37.5% knew how to perform CPR, among young dental graduates of a dental school and hospital in Mangalore. This percentage is lower when compared to our study where 76.9% undergraduates and 92.8% pgs knew how to perform CPR. Whereas, the competency to administer IM (43.8%) and SC (49.4%) injections was reported to be higher among the participants of Shenoy *et al*. [8] study as compared to our study. In a study by Jodalli *et al*. [12], 30.5% participants feel competent to administer IV injections and 41.9% feel competent to administer IM injections. During medical emergencies, BLS is a key component which improves the chances of survival as it prevents CNS from undergoing irreversible damage due to hypoxia or anoxia. Thus, providing BLS to patients is certainly an important step before definitive treatment is planned [8, 16, 17]. Present study showed that only one fourth of participants have practical training to handle medical emergencies. In study by Jodalli *et al*. [12], it was found that only 57.1% participants have received BLS training. Therefore, it is evident that there is an alarming need for a separate and thoroughly planned BLS and ALS programme for dental professionals. And it's emboldening to know that most of participants are willing to undergo proper and thorough training for the same. The result of our study revealed that even though medical emergencies are quite common in dental set-up, the dental professionals have low competence in handling them. The participants have theoretical knowledge about the medical emergencies but they are not confident enough to deal with them. They lack adequate training, which could be attributed to a deficient dental curriculum. The curriculum should be meticulously designed to lay emphasis on both quality and volume of medical emergency training which dental professionals receive. Arrangement should be made to keep them updated with the revisions and additions in the medical emergency guidelines via continuing dental professional programmes.

Conclusion

Dental professionals should be confident and prepared to deal with medical emergencies arising during their practice. However, the data from our study and other recent studies showed lack of competence and confidence among them to deal with medical emergencies. This is pointing towards an alarming situation that should be dealt by dental councils around the globe. Reforms in the dental curriculum and thorough training of dental professionals at an initial stage will help to increase their confidence and competence to deal with medical emergencies. Thus, reducing threat and increasing the survival rate of patients, as well.

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