Research Article

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Knowledge and Preparedness for Medical Emergencies in Dental Settings among the Dental Interns

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ABSTRACT

Introduction: Medical emergencies do occur in dental settings and the situation can be alarming in the absence of adequate preparations and effective management. It is necessary for the dentists and the dental team to be trained enough to attend such medical emergency situations.

Objective: To assess the knowledge and preparedness for medical emergencies in dental settings among the dental interns.

Materials and Method: A descriptive cross-sectional study was conducted at department of community and public health dentistry, Nepal Medical College. Study participants were 156 dental interns selected by simple random sampling from the dental colleges of Kathmandu from November, 2020 to January, 2021. Data was collected with the help of a self-administered structured questionnaire that was sent to selected study participants on Google forms via social media. Data were analysed using SPSS v.20 and expressed as mean, standard deviation, frequency, and percent.

Result: A total of 145 study participants responded to the questionnaire with a response rate of 92.95% (145 out of 156). Of them, 76 (52.41%) had observed at least one medical emergency situation and the majority 63 (82.89%) had encountered syncope. Only 13 (8.97%) had undertaken workshops or trainings on medical emergencies. More than 109 (75%) gave correct responses regarding most of the knowledge-related questions while less than 73 (50%) showed self-perceived preparedness for medical emergency management.

Conclusion: The study found that few dental interns had preparedness to tackle medical emergency situations and very few had taken trainings or workshops regarding medical emergencies.

Keywords: Dental; emergencies; medical; Nepal; preparedness.

INTRODUCTION

Medical emergencies are unforeseen onsets of serious health problems that may be life threatening if not attended in time.[1] Medical emergencies create stressful experience for both the dental team and the patients in the dental office. Commonly encountered medical emergency situations in dental office are syncope, seizures, allergic reactions, hypoglycemia, accidental inhalation and choking.[2-5] Medical emergencies among the elderly patients

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may be due to increased comorbid conditions like diabetes, hypertension, and heart diseases[6-8] and through the drugs prescribed for such conditions.[9] Fear and anxiety during dental treatment[10] can also precipitate occurrence of medical emergencies. So recognising 'at risk' patients and adopting appropriate and possible modifications while undergoing dental treatment help minimise the risks and avoid adverse conditions among such patients.

Dental interns will have to deal with dental patients without any supervision after completing their internship. Adequate knowledge and skills gained through proper trainings would help them tackle such unforeseeable events during the dental practice. Any relevant literature regarding preparedness of dental interns for dealing with medical emergencies could not be assessed in context of Nepal.

The objective of this study was to assess the knowledge and preparedness for medical emergencies in dental settings among the dental interns of Kathmandu.

MATERIALS AND METHOD

A descriptive cross-sectional study was conducted among the dental interns of all the five dental colleges of Kathmandu, Nepal that had internship program during the study period. Data was collected from November, 2020 to January, 2021 with the help of Google Forms (Alphabet Inc., USA) shared via social media (Email, Messenger, and Viber). A reminder was also sent every month to the non-respondents during the data collection duration. The Google Form included a structured questionnaire that included questions on socio-demographic details, knowledge, experience, trainings undertaken and self-rated preparedness for medical emergency in dental settings adopted from various studies.[4,11-13] Knowledge related questions had multiple options whereas preparedness related questions had dichotomous options (Yes for correct answer and No for wrong ones). In the knowledge and preparedness related questions, each correct answer was assigned a score of "1" and each wrong answer was assigned a score of "0." The total scores obtained from the responses of each participant was interpreted as adequate (score 6 to 10) and inadequate (score 0 to 5).

Ethical clearance was obtained from Institutional Review Committee, (Ref. 029-077/078) and verbal permission was taken from the concerned authorities from all the five dental colleges prior to the study. Informed consent was attached along with Google Form before the questionnaire and those who agreed to participate and clicked yes could only get access to the questionnaire section. Those dental interns who gave consent and who were currently having their internship in their dental colleges during the study period were included in the study.

Sample size was calculated by using the formula of proportion for finite population size:

$n = (Z^2 \times p \times q)/ \{d^2 + (Z^2 \times p \times q)/ N\} = 140;$

Where, n = required sample size; Z = 1.96 at 95% confidence interval; p = expected prevalence = 0.37 (37%) = proportion of participants confident to handle any medical emergencies in the dental office obtained from a previous study;[12] q = 1-p; d = margin of error = 0.05 (5%); and N = Total number of dental interns undergoing internship program in all the dental colleges of Kathmandu during the study period = 224. Non-response rate of 10% was taken and the minimum sample size was determined to be 154. To make proportionate sampling easier, the number had to be increased to 156, which was the final sample size of the study. Further keeping response rate as 90%, the final sample size was calculated to be 156. Since the number of dental interns was different in each of the dental colleges, the sample was also taken proportionately. Sampling was further done by random sampling method.

Responses were collected into a spreadsheet and exported to IBM SPSS Statistics for Windows, version 20 (IBM Corp., Armonk, N.Y., USA) for further analysis. Descriptive statistics were presented in the form of frequency, percent, mean, and standard deviation. The responses of the dental interns were sent through email to the concerned authorities of their respective colleges to help in planning any trainings for the dental interns in the future, if necessary.

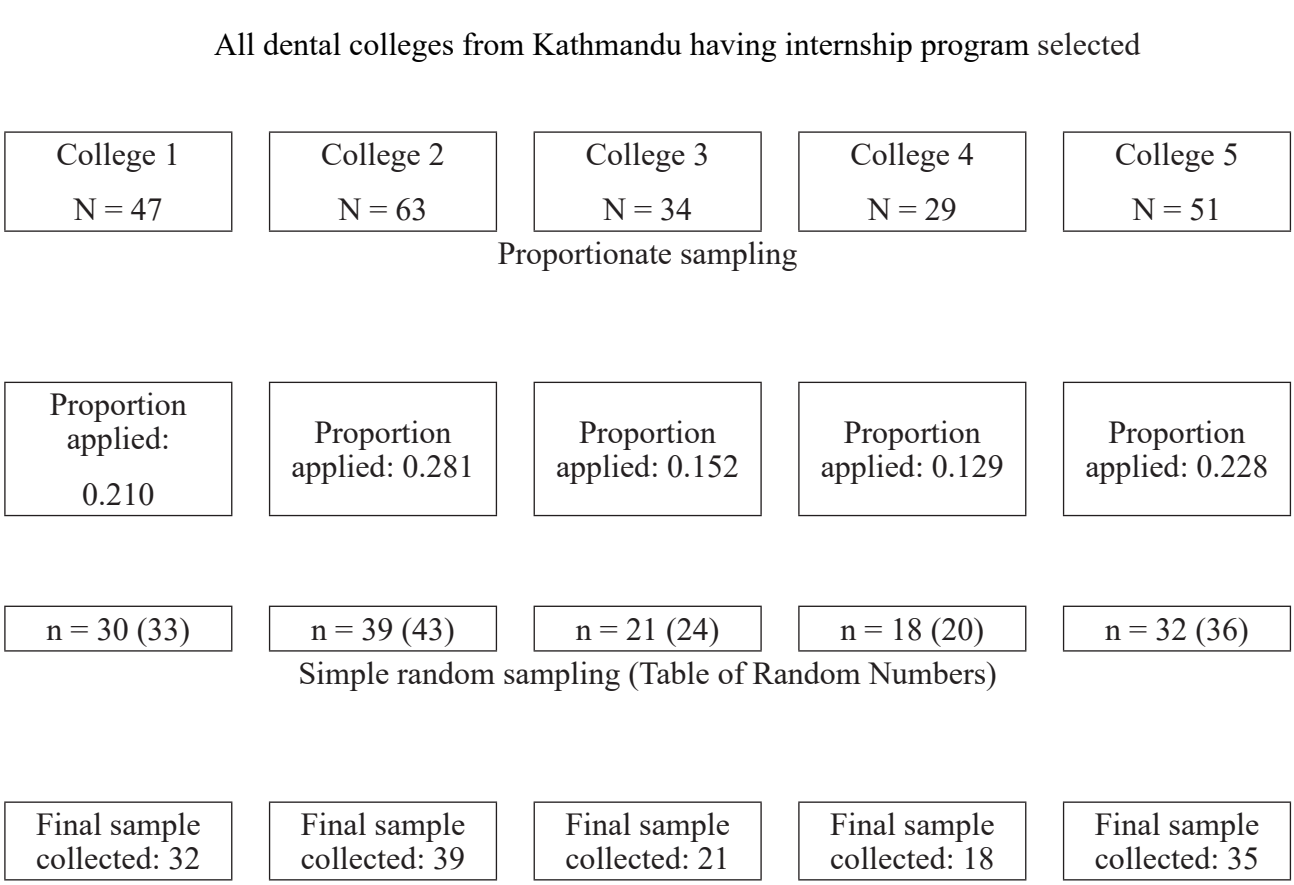

Figure 1: Flow diagram showing recruitment of participants (N = Total number of interns; n = Calculated sample size with adjustment of 90% response rate).

RESULT

One hundred and forty five out of 156 study participants responded to the questionnaire (response rate 92.95%). Of them, 39 (26.89%) were males and 106 (73.11%) were females. The age of the study participants ranged from 22 to 28 years with mean age 24.70 ± 1.07 years. Thirteen (8.97%) had attended some type of workshop or training on medical emergency of which eight (61.54%) had attended seminar, three (23.08%) had attended workshop, one (7.69%) had attended simulation and one (7.69%) had attended other type of training which they did not specify. Seventy-six (52.41%) study participants had observed at least one medical emergency situation since their clinical postings in different dental departments as a student. Twenty one (27.63%) study participants

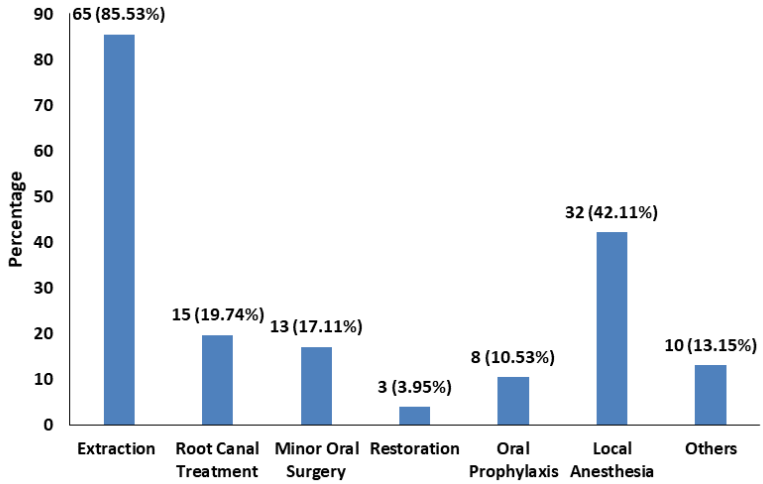

Figure 2: Responses regarding medical emergency situations encountered (n = 76).

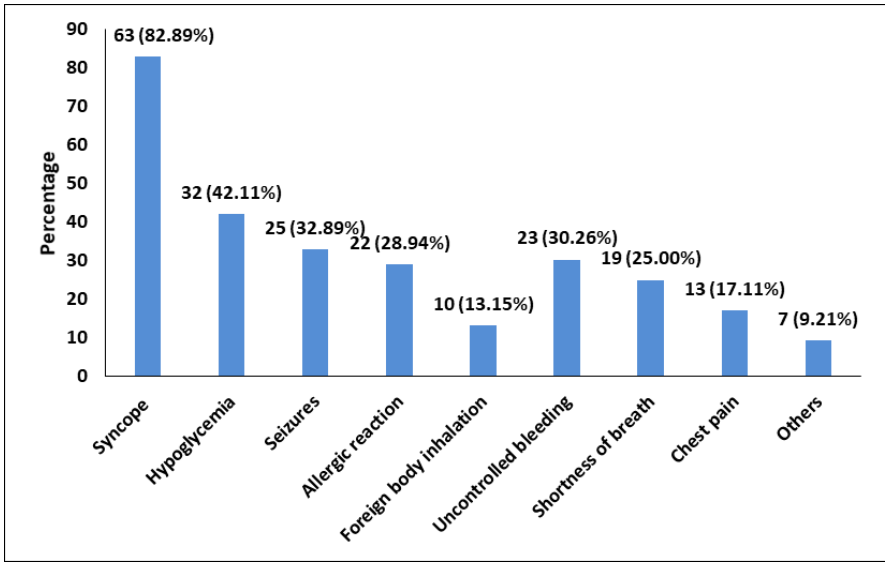

Figure 3: Responses regarding dental procedures in which medical emergency situations were encountered (n = 76, Percent shown in Y axis).

among them reported to have managed the medical emergency situation by themselves. Majority of them (63, 82.89%) encountered syncope and 32 (42.11%) encountered hypoglycemia (Figure 2).

Majority (65, 85.53%) had encountered medical emergency situations during extraction while three (3.95%) had encountered it during restoration (Figure 3).

Majority 48 (63.15%) had observed that the most common medical procedure given during medical emergency situations was medical emergency drugs and only two (2.63%) had observed it as automated external defibrillation.

Of the total, only 25 (17.20%) gave the correct response regarding the sequence of managing medical emergencies and only 35 (24.14%) were aware of what should be done in case of epileptic fits in the dental chair. Majority of the study participants gave the correct responses for positioning in management of syncope (134, 92.41%), location of chest compression (66, 45.52%), drug of choice in anaphylaxis (117, 80.69%), drug of choice for angina (130, 89.65%), measures adopted for aspiration of foreign body (110, 75.86%) and the right compression/ ventilation ratio (103, 71.03%). Most of them (136, 93.79%) knew that it is necessary to obtain the vital signs of all patients before commencement of dental treatment. All of the study participants were aware that emergency drugs should always be present in the dental setup (Table 1).

All the study participants took thorough medical and drug history from the patient. Most of them (115, 79.31%) obtained the vital signs before commencing any treatment and 121 (83.45%) followed stress reduction protocol while treating patients. Less than half of the study participants (23, 15.86%) performed a test dose before administration of local anaesthesia, 60 (41.38%) had confidence to give an intramuscular injection, 30 (20.69%) intravenous injection, and 41 (28.28%) subcutaneous injection. Of all, 58 (40%) could perform cardiopulmonary resuscitation (CPR), 55 (37.93) could perform the Heimlich manoeuvre, and 117 (80.69%) could check the carotid pulse (Table 2).

The mean knowledge and preparedness score of the study participants was adequate that were 6.90±1.20 and 5.28±1.86 respectively.

Table 1: Responses for knowledge related questions (N = 145).

Responses		Total n (%)
1. If P-position, A-airway, B-breathing, C-circulation, D-definitive management, then the correct sequence is	P-A-B-C-D	111 (76.55)
	P-B-A-C-D	9 (6.21)
	P-C-A-B-D*	25 (17.24)
	P-D-A-B-C	-
2. Correct position for patient suffering from syncope	Prone	5 (3.45)
	Semi prone	2 (1.38)
	Tredelenburg*	134 (92.41)
	Upright	4 (2.76)
3. Correct location of chest compression	Left side of chest	16 (11.03)
	Mid chest*	66 (45.52)
	Right side of chest	1 (0.69)
	Xiphisternum	62 (42.76)
4. Drug of choice in case of anaphylaxis?	Adrenaline*	117 (80.69)
	Antihistamine	23 (15.86)
	Corticosteroids	3 (2.07)
	Vasodilators	2 (1.38)
5. In case of epileptic fits in the dental chair, you	Continue dental treatment	1 (0.69)
	Inject iv. diazepam	36 (24.83)
	Make the patient lie on lateral position*	35 (24.14)
	Wait and observe	73 (50.34)
6. Drug of choice for angina	Aspirin	10 (6.90)
	Nitroglycerine*	130 (89.65)
	Nitrous oxide	3 (2.07)
	Salbutamol	2 (1.38)
7. Measure adopted for aspiration of foreign body	Ask patient to cough	12 (8.28)
	Attempt Heimlich manoeuvre*	110 (75.86)
	Examine mouth	3 (2.07)
	Take a chest x-ray	20 (13.79)
8. Emergency drug should always be present in the dental setup?	Yes*	145 (100)
	No	-
9. The right compression/ ventilation ratio is	15/1	7 (4.83)
	15/2	29 (20)
	30/1	6 (4.14)
	30/2*	103 (71.03)
10. It is necessary to obtain the vital signs of all patients before commencement of dental treatment	Yes*	136 (93.79)
	No	9 (6.21)

**correct responses*

Table 2: Responses for self-perceived preparedness for medical emergency management(N = 145).

Responses	Yes, n (%)	No, n (%)
1. Take thorough medical and drug history from the patient	145 (100)	-
2. Obtain the vital signs before commencing any treatment	115 (79.31)	30 (20.69)
3. Perform a test dose before administration of local anaesthesia	23 (15.86)	122 (84.14)
4. Follow stress reduction protocol while treating patients	121 (83.45)	24 (16.55)
5. Confident to give an intramuscular injection	60 (41.38)	85 (58.62)
6. Confident to give an intravenous injection	30 (20.69)	115 (79.31)
7. Confident to give a subcutaneous injection	41 (28.28)	104 (71.72)
8. Confident to perform cardiopulmonary resuscitation	58 (40)	86 (60)
9. Confident to perform the Heimlich manoeuvre	55 (37.93)	90 (62.07)
10. Confident to check the carotid pulse	117 (80.69)	28 (19.31)

DISCUSSION

Medical emergencies can create stressful experience for both the dental team and the patients in the dental office. Having adequate skills in managing such situations can help minimise the risks and avoid the adverse conditions among such patients. In Nepal, the accreditation standards for Bachelor of Dental Surgery (BDS) by Nepal Medical Council states that a dental graduate should be competent to prevent and manage majority of medical emergency situations encountered in the dental practice settings.[14] Though BDS undergraduate curriculum covers theoretical aspect of medical emergencies in the subjects of General Medicine and Oral and Maxillofacial Surgery, there is a lack of mandatory training programs regarding medical emergencies for the undergraduates. The current study was thus aimed to assess the knowledge and preparedness of the dental interns regarding medical emergency situations in dental settings. The present study is the first of its kind in context of Nepal.

In the current study, only 13 (8.97%) had attended workshop or training on medical emergencies. In contrast, higher proportion of respondents had undertaken medical emergency training in studies by Leelavathi et al.[15] (33%), Jodalli et al.[9] (57%), and Paul et al.[16] (68.30%). Almost half of the study participants in this study had encountered at least one medical emergency situation. However, a higher number of study participants encountered this situation in studies by Paul et al.[16] (70%), Jodalli et al.[9] (58.10%) and a study by Elanchezhiyan et al.[17] showed a lower proportion (34%). This variation in the findings could be due to difference in the study settings. In the present study, syncope was the most common medical emergency situation encountered. Similar finding was observed in studies by Paul et al.,[16] Elanchezhiyan et al.[17] and Somaraj et al.[18] This could be due to the stress induced by dental fear, anxiety and pain which are seen in higher prevalence among the dental patients, a finding supported by various studies.[19-21] Majority of the study participants (65, 85.53%) encountered medical emergency situations during tooth extraction. This finding is in accordance to a study by Joshi et al.[4]

American Heart Association (2011) recommends P-C-A-B-D as the correct CPR sequence, 30 chest compressions followed by two breaths as the correct chest compression to ventilation ratio and mid chest as the correct location of chest compression.[22] In the present study less than half of the study participants gave correct responses regarding CPR sequence and location of chest compression which was in accordance to a study by Mohan et al.[23] Studies by Albelaihi et al.[12] and Chopra et al.[24] showed higher proportion of correct responses regarding location of chest compression. Majority of the study participants gave correct answers for management of syncope and aspiration, drug of choice for anaphylaxis and angina, location of chest compression, compression to ventilation ratio and necessity of emergency drugs and vital signs recording in dental setup.

In the current study, 136 (93.79%) the study participants agreed that it is necessary to take vital signs before dental treatment, which is similar to a study by Elanchezhiyan et al.[17] However, only 115 (79.31%) of current study participants obtained the vital signs before commencing any treatment. This proportion was higher than that seen in a study by Kumarswami et al.[11] Monitoring vital signs is very important as it helps in the detection of acute medical emergencies.[25] In the current study, more than half of the study participants were not confident to give injections intramuscularly, intravenously and subcutaneously to the dental patients. Similar finding was also seen studies by Raffee et al.[13] and Jodalli et al.[9] This could be due to the fact that these injections are not routinely performed during BDS undergraduate training. Since these are the frequently used routes of administration of emergency drugs, lack of competency among most of the study participants emphasises the need for proper trainings with regard to the skills to apply injections. Less than half of study participants in this study were confident to perform cardiopulmonary resuscitation and Heimlich manoeuvre and 80.69% of them were confident to check the carotid pulse, similar to a study by Raffee et al.[13]

In the present study, the mean knowledge and preparedness of the study participants was found

to be adequate. However majority of them were not confident to perform most of the procedures regarding medical emergency management. This shows that theoretical knowledge alone cannot help gain skills for managing medical emergency situations.

This study, being an online survey, had certain unavoidable limitations due to the nature of data collection like bias on the part of participants (response bias due to unlimited time, inability to clear doubts from the researcher at the same time of filling questionnaire) and technical/ internet errors causing incomplete submission of the questionnaire. However, efforts on proper sampling techniques had been made by the researchers for the generalisability of the results.

CONCLUSION

The present study showed that though most of the dental interns had knowledge regarding various medical emergency situations, more than half of them lacked preparedness for most of the procedures asked. Only one tenth of them had received trainings regarding medical emergency. So mandatory training and workshops regarding basic life support and emergencies need to be incorporated in the BDS curriculum. Concerned government and non-government authorities such as Ministry of Health and Population, Nepal Dental Association, Nepal Medical Association, etc. need to conduct such trainings regularly for the dental undergraduates and the dental professionals to increase their competency as well as update their knowledge and skills.

Conflict of interest: None.

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