Abstract

Background: A medical emergency is an unwanted, unexpected reaction or complication, and few studies that assessed the knowledge and competency about emergencies in the dental clinics in Nigeria have been focussed on dentists and interns. This study, therefore, seeks to assess knowledge and self-assessed preparedness on medical emergencies amongst undergraduate dental students at two dental schools in Lagos State. Methodology: This was a descriptive study at two dental schools in Lagos State. The participants were selected consecutively from the class using the class register of the final-year undergraduate students of the two dental schools in Lagos for the 2017/2018 academic year as the sampling frame. Data were collected using a pre-tested structured close-ended self-administered questionnaire. Data entry and analysis were done using SPSS version 20, and \( P < 0.05 \) was considered statistically significant. Results: The age of the respondents ranged from 20 to 29 years with a mean age of 23.60 ± 2.1. Ninety-three per cent of students adequately assessed the patient’s medical history, but only 64.9% regularly used a medical pro forma to obtain the health history of the patients. Forty (72%) respondents believed that they had good medical emergency preparedness while 17 (28%) assessed themselves as having poor skills. However, 38.6% of the students had poor knowledge about medical emergencies while 50% had fair knowledge. Only 10.5% of the students had good knowledge. Conclusion: Although many of the dental students indicate that they had good emergency preparedness, an assessment of their knowledge showed that only 10.5% of the students had good knowledge about handling medical emergencies. This highlights the need for a review of curriculum as well as a modification in delivery style to a practical, hands-on teaching and emergency scenarios simulations to enhance the students’ skills and self-confidence in managing emergencies in a dental setting.

Keywords: Dental students, knowledge, medical emergency, preparedness

INTRODUCTION

A medical emergency can be described as an unwanted, unexpected reaction or complication which usually requires immediate attention or intervention. It can be challenging or distressing, especially to those medical personnel who are not proficient in the handling of medical emergencies. Medical emergencies can occur in the dental clinic during dental treatment with events such as loss of consciousness/vasovagal syncope, adverse reaction to local anaesthesia, choking, asthmatic attack and seizures being some of the commonly reported events.\(^1\)\(^2\) It is thus imperative that dentists are also trained and knowledgeable in the management of these emergencies.

Pre-existing medical conditions may play a role in the emergencies in the dental clinic, either directly or indirectly through drugs prescribed for the management of such conditions.\(^3\) Furthermore, dental procedures may be associated with a number of risks such as airway compromise and aspiration of instruments. Dental anxiety can also cause medical emergencies in a number of patients. Dentists must be aware of possible medical emergencies that may
occur in a practice, as well as their signs, symptoms and treatment. Basic life support includes ABC, the maintaining of airway and supporting breathing and circulation. Training is required to perform cardiopulmonary resuscitation (CPR) in any medical emergency.\cite{5,6} Since dentists are primarily responsible for the patient’s welfare in the dental clinic, it is important that they are properly trained in the effective management of emergencies, use of necessary drugs/equipment and emergency procedures such as basic life support.

A number of studies have assessed the competency level of dentists in managing dental emergencies with findings showing some degree of lack of knowledge about basic life support amongst interns and fresh graduates.\cite{5,6}\cite{7} In addition to this, a previous study highlighted a lack of content or training for emergency in the undergraduate curriculum.\cite{7} Studies done in Nigeria showed a lack of adequate preparation for emergencies in dental clinics owned by the government in Lagos State.\cite{8}\cite{9} Another Nigerian study highlighted a relatively adequate knowledge about medical emergencies amongst dentists. However, their clinics were not adequately equipped and prepared for such emergencies.\cite{9} The few studies that assessed the knowledge and competency about emergencies in the dental clinics have been focussed on dentists and interns. Little is known about how much of these training is given to undergraduate dental students.\cite{2,5}\cite{2,5} This study, therefore, seeks to assess knowledge and self-assessed preparedness on medical emergencies amongst undergraduate dental students at two dental schools in Lagos State.

**Methodology**

**Study design**

This is a descriptive cross-sectional study.

**Study location**

The study was conducted amongst final-year dental students in the dental schools affiliated to the two teaching hospitals in Lagos State, South West Nigeria, serving an estimated population of about 20 million hospital, providing training at both undergraduate and post-graduate levels and referral services for diagnosis and treatment of the full range of clinical dental specialities. The dental schools, namely Lagos University Teaching Hospital and Lagos State University Teaching Hospital, have trained a number of dentist with training covering all the different aspects of Dentistry namely Oral and Maxillofacial surgery, restorative dentistry, child dental health, preventive dentistry/community dentistry, oral pathology, oral radiology, periodontics, oral radiology and oral medicine.

**Study setting**

The study was done in both dental schools simultaneously. This was done during one of the lectures of the students in their classroom.

**Sample size determination**

\[ N = \frac{Z^2pq}{d^2} \]

Where:

- \( N \) = The estimate of the population size
- \( Z \) = Critical value at the level of the chosen confidence level.
- \( d \) = the precision level set at 0.05
- \( p \) = 0.37 using a prevalence of 37% from a similar study conducted amongst dental students.\cite{10}
- \( q \) = 1 - \( p \)
- \( Z \) = 1.96 (standard normal deviate)
- \( N \) = 210.

Fifty-seven students were, however, recruited for the piloting of the study in dental schools in Lagos State.

**Inclusion criteria**

1. Final-year undergraduate students in the two dental schools
2. Participants who must have completed all courses in penultimate class without any outstanding reference.

**Exclusion criteria**

1. Participants who voluntarily declined not to partake in the study.

**Sample selection**

The participants were selected consecutively from the class using the class register of the final-year undergraduate students of the two dental schools in Lagos for the 2017/2018 academic year as the sampling frame.

**Ethical considerations**

The protocol and procedures for this research were presented to the LASUTH Health Research and Ethics Committee, and written approval was acquired (LREC. 06/10/1086). Participation was voluntary for all study participants, and they were informed that they were free to decline to enlist and to withdraw from the study. Written informed consent was obtained from all the participants.

**Study material/procedure**

Data were collected using a pre-tested structured close-ended self-administered questionnaire. The questionnaire was pre-tested on 15 dental house officers in LUTH and LASUTH with similar characteristics with the study population. The questionnaire was subsequently modified to ensure clarity and reliability. The study questionnaires were distributed to the students who made the study participants after their morning lecture sessions before they proceeded to the dental operatories for clinical duties. The purpose of the questionnaire was explained by the principal investigator and its anonymous nature was emphasised. The questionnaire was divided into three main sections namely: Background information; knowledge of medical procedures related to emergencies in the dental setting and emergency drugs and equipment.
possessed which had ‘yes,’ ‘no’ or ‘I don’t’ know responses; Self-evaluation on specific medical procedures and clinical scenarios that assessed the competencies of the respondents about medical emergencies also had multiple choice responses.

Data analysis
The data collected were tabulated and analysed using the Statistical Package for the Social Sciences for Windows (version 20, Chicago, IL, USA) statistical software package. The results were expressed in terms of proportion and percentages while the Chi-square was used as test of association. In assessing knowledge, one score was assigned for the correct option as 1 and a score of 0 was given for wrong responses. For the 10 questions, the minimum and maximum possible scores were 0 and 10, respectively, which were graded as ≤3; poor, 4–6 as fair and >6 as good. Eight questions were used to assess the self-assessed emergency preparedness of the respondents, and using the mean value for dichotomy, scores ≤4 were rated as poor and scores >4 were rated as good. Differences and associations were considered statistically significant where the associated $P \leq 0.05$.

Results
The age of the respondents ranged from 20 to 29 years with a mean age of $23.60 \pm 2.1$. A higher proportion of the respondents were female (34; 59.6%), and majority (39; 68.4) were of the Yoruba ethnic group [Table 1].

Ninety-three per cent of students adequately assessed the patient’s medical history, but only 64.9% regularly used a medical pro forma to obtain the health history of the patients. A high proportion of the students (78.9%) had attended lectures or training on emergency training or management program while 66.7% think that emergency condition can be handled at dental clinic. Majority of the respondents (91.2%) obtain or have access to the vital medical signs before commencing treatment, but only 59.6 felt adequate to give intravenous or intramuscular injections [Table 2].

Using a correct response to 50% of the questions on self-assessed emergency preparedness amongst the dental students as the mean value and values above and below the mean as good or poor preparedness, 40 (72%) of the respondents believed that they had good medical emergency preparedness while 17 (28%) assessed themselves as having poor skills [Figure 1].

Table 1: Sociodemographic characteristics of respondents ($n=57$)

| Variable          | Frequency, $n$ (%) |
|-------------------|--------------------|
| Age group (year)  |                    |
| 20-24             | 43 (75.4)          |
| 25-29             | 14 (24.6)          |
| Mean±SD           | 23.60±2.1          |
| Gender            |                    |
| Male              | 23 (40.4)          |
| Female            | 34 (59.6)          |
| Ethnic group      |                    |
| Yoruba            | 39 (68.4)          |
| Hausa             | 2 (3.5)            |
| Igbo              | 12 (21.1)          |
| Others            | 4 (7.0)            |

SD: Standard deviation

Table 2: Self-assessed medical emergency preparedness amongst the respondents ($n=57$)

| Medical skills (multiple response) | Frequency (%) |
|------------------------------------|---------------|
| Enquire about past medical history | 53 (93.0)     |
| Filled health history pro forma for the patients | 37 (64.9)     |
| Obtain or have access to the vital medical signs before commencing treatment | 52 (91.2)     |
| Attended lectures or training on emergency training or management program | 45 (78.9)     |
| Think emergency conditions can be handled at dental clinic | 38 (66.7)     |
| Can give intramuscular injection | 34 (59.6)     |
| Can give intravenous injection | 34 (59.6)     |

Figure 1: Grouping of self-assessed medical emergency preparedness.

33.3% knew that all the recommended procedures to eject the foreign body were correct. Only 14 (24.6%) of the students knew that the immediate action to take on confirming that a patient is not responding even after shaking and shouting is to activate emergency medical services (EMS), but majority of participants (49.1%) knew the correct location of chest compression which is the middle of the chest and 57.9% knew
Table 3: Self-reported knowledge about medical emergencies ($n=57$)

| Variable                                                                 | Frequency (%) |
|--------------------------------------------------------------------------|---------------|
| Immediate action if patients suffers from syncope when a dental procedure is commenced |               |
| Continue dental procedure                                                | 5 (8.8)       |
| Place patient in Trendelenburg position and give ammonia inhalant         | 29 (50.9)     |
| Make patient sit in upright position                                      | 12 (21.1)     |
| Make patients to stand                                                    | 4 (7.0)       |
| Don’t know                                                                | 7 (12.3)      |
| Immediate action in patients with airway obstruction during dental treatment due to aspiration of foreign body |               |
| Attempt Heimlich/triple manoeuvre                                         | 26 (45.6)     |
| Examine mouth and local area                                              | 8 (14.0)      |
| Ask patient to cough                                                      | 2 (3.5)       |
| All of the above                                                          | 19 (33.3)     |
| Don’t know                                                                | 5 (8.8)       |
| Immediate action after confirming patient is not responding even after shaking and shouting |               |
| Start CPR                                                                 | 27 (47.4)     |
| Activate EMS                                                              | 14 (24.6)     |
| Put him in recovery position                                              | 4 (7.0)       |
| Observe                                                                  | 7 (12.3)      |
| Don’t know                                                                | 5 (8.8)       |
| Planning for extraction of a tooth in patients with prosthetic heart valve |               |
| Advise antibiotic prophylaxis                                             | 19 (33.3)     |
| Ask the patient to stop blood thinners                                    | 3 (5.3)       |
| Advise the patient to take consent from the general physician             | 2 (3.5)       |
| All of the above                                                          | 32 (56.1)     |
| Don’t know                                                                | 1 (1.8)       |
| Procedures likely to be performed in patients with prosthetic heart without giving antibiotics |               |
| Dental radiographs                                                        | 27 (47.4)     |
| Placement of orthodontic brackets                                         | 8 (14.0)      |
| Placement of removable prosthesis and orthodontic appliances              | 1 (1.8)       |
| All of the above                                                          | 18 (31.6)     |
| Don’t know                                                                | 3 (5.3)       |
| Abbreviation of BLS                                                       |               |
| Best life support                                                         | 3 (5.3)       |
| BLS                                                                       | 47 (82.5)     |
| Basic lung support                                                        | 4 (7.0)       |
| Basic life services                                                       | 2 (3.5)       |
| Don’t know                                                                | 1 (1.8)       |
| Location of chest compression                                             |               |
| Left side of the chest                                                    | 9 (15.8)      |
| Right side of the chest                                                   | 1 (1.8)       |
| Mid-chest                                                                | 28 (49.1)     |
| Xiphisternum                                                             | 17 (29.8)     |
| Don’t know                                                                | 2 (3.5)       |
| Ratio of CPR, for single rescuers in adult patients                       |               |
| 15:01                                                                    | 14 (24.6)     |
| Don’t know                                                                | 5 (8.8)       |

Table 3: Contd...

| Variable                                                                 | Frequency (%) |
|--------------------------------------------------------------------------|---------------|
| Immediate action in patients with airway obstruction during dental treatment due to aspiration of foreign body |               |
| Attempt Heimlich/triple manoeuvre                                         | 26 (45.6)     |
| Examine mouth and local area                                              | 8 (14.0)      |
| Ask patient to cough                                                      | 2 (3.5)       |
| All of the above                                                          | 19 (33.3)     |
| Don’t know                                                                | 5 (8.8)       |
| Immediate action after confirming patient is not responding even after shaking and shouting |               |
| Start CPR                                                                 | 27 (47.4)     |
| Activate EMS                                                              | 14 (24.6)     |
| Put him in recovery position                                              | 4 (7.0)       |
| Observe                                                                  | 7 (12.3)      |
| Don’t know                                                                | 5 (8.8)       |
| Planning for extraction of a tooth in patients with prosthetic heart valve |               |
| Advise antibiotic prophylaxis                                             | 19 (33.3)     |
| Ask the patient to stop blood thinners                                    | 3 (5.3)       |
| Advise the patient to take consent from the general physician             | 2 (3.5)       |
| All of the above                                                          | 32 (56.1)     |
| Don’t know                                                                | 1 (1.8)       |
| Procedures likely to be performed in patients with prosthetic heart without giving antibiotics |               |
| Dental radiographs                                                        | 27 (47.4)     |
| Placement of orthodontic brackets                                         | 8 (14.0)      |
| Placement of removable prosthesis and orthodontic appliances              | 1 (1.8)       |
| All of the above                                                          | 18 (31.6)     |
| Don’t know                                                                | 3 (5.3)       |
| Abbreviation of BLS                                                       |               |
| Best life support                                                         | 3 (5.3)       |
| BLS                                                                       | 47 (82.5)     |
| Basic lung support                                                        | 4 (7.0)       |
| Basic life services                                                       | 2 (3.5)       |
| Don’t know                                                                | 1 (1.8)       |
| Location of chest compression                                             |               |
| Left side of the chest                                                    | 9 (15.8)      |
| Right side of the chest                                                   | 1 (1.8)       |
| Mid-chest                                                                | 28 (49.1)     |
| Xiphisternum                                                             | 17 (29.8)     |
| Don’t know                                                                | 2 (3.5)       |
| Ratio of CPR, for single rescuers in adult patients                       |               |
| 15:01                                                                    | 14 (24.6)     |
| Don’t know                                                                | 5 (8.8)       |

that the ratio of respiration to chest compressions in CPR by single resuscuer in adult patients is 30:02.

Regarding the availability of emergency medication and kits at the dental clinic, the most common drugs available were adrenaline (42.1%), glucose (35.1%) and epinephrine (28.1%) as shown in Figure 2. The least common drug was ammonia inhalant (7.0%).

In assessing the knowledge of the scores of the student, 38.6% of the students had poor knowledge about medical emergencies while 50% had fair knowledge. Only 10.5% of the students had good knowledge [Figure 3].

Although not statistically significant, on checking the percentages, females and younger students aged between 20 and 24 years had more respondents with good knowledge of dental emergencies than males and those that were aged between 25 and 29 years [Table 4].

Similarly, females and younger students aged between 20 and 24 years had more respondents with good knowledge of dental emergencies than males and those that were aged between 25 and 29 years [Table 5].

A cross tabulation of the knowledge and emergency preparedness of the respondents shows that those with good knowledge had a higher proportion of respondents with good emergency medical skills [Table 6].

**Discussion**

Medical emergencies are often considered to be relatively rare in the dental setting, with an average prevalence of 0.22–0.7 per dentist per year in general practice[1,11] and 1.8 per year in a dental hospital setting[12]. Nevertheless, such situations could occur at any time, and for the family of the victim, whenever it occurs, the morbidity or mortality statistic is 100%. A necessary part of dental care is the need to be able to manage medical emergencies when they arise. Traditional
training in managing medical emergencies in the dental school begins with lecture-based coursework.[13]

Females constituted a higher proportion of the respondents in this study making up almost 60% of the final-year dental students, which is an emerging trend in medical schools where females continue to increase in proportion in annual enrolment. Majority of the respondents stated that they adequately assessed the patient’s medical history, but only 64.9% regularly used a medical pro forma to obtain the health history of the patients. This was lower than the value obtained in a previous study where 89.5% of respondents recorded the medical history of their patients, including medications and allergy before dental treatment.[10] Since attention to detail varies depending on the clinician attending to the patient and also due to the volume of work each dentist encounters, a medical pro forma is desirable so that vital aspects of patients’ history that can predispose them to medical emergencies are not omitted. A detailed and precise medical record provides the crucial information to assist in recognising patients at risk for medical emergencies so that modifications can be made to treatment planning or adequate arrangements made for their referral for specialist review and management.[14]

A high proportion of the students (78.9%) had attended lectures or training on emergency training or management program. This was in contrast to a study conducted amongst dental students in 124 final-year dental students of the University of Benin, Benin City; only 28.2% of the studied dental students claimed to have received the desired forms of training on medical emergencies while an alarming 41.9% claimed not to have received any form of training.[15] It also contrasts to what was reported amongst a group of students where 85.3% of them had never taken any basic life support course.[16] Studies carried out in various countries have revealed that dental surgeons were not confident about managing medical emergencies[17] and that many had never had any form of practical training in resuscitation.[18] Majority of dentists opined that there was a need for further training and that hands-on courses would improve their preparedness.[13,19]

Majority of our study respondents (91.2%) obtain or have access to the vital medical signs before commencing treatment and 59.6% felt adequate to give intravenous or intramuscular injections. This was in agreement with a Brazilian study where majority of responding dentists judged themselves capable of giving intramuscular or subcutaneous injections, checking the carotid pulse or a patient’s breathing, checking blood pressure and performing abdominal compressions for dealing with obstructed airways.[20] Thus, findings from our study are encouraging because vital signs including blood pressure, pulse, respiratory rate and temperature offer a baseline measurement from which alterations in the patient’s condition can be determined.[21] They, however, may need to be further trained on the skill of venepuncture.

Figure 2: Available emergency medical drugs at the dental clinic.

Figure 3: Grouping of self-assessed knowledge about medical emergencies.

Table 4: Association between knowledge about medical emergencies and selected sociodemographics

| Knowledge about emergencies | Poor | Fair | Good | Total | Statistics |
|-----------------------------|------|------|------|-------|------------|
| Age group (years)           |      |      |      |       |            |
| 20-24                       | 16 (37.2) | 22 (51.2) | 5 (11.6) | 43 (100.0) | $F=0.292$, df=2, $P=0.864$ |
| 25-29                       | 6 (42.9)  | 7 (50.0)  | 1 (7.1)   | 14 (100.0) |            |
| Gender                      |      |      |      |       |            |
| Male                        | 7 (30.4)  | 15 (65.2) | 1 (4.3)   | 23 (100.0) | $F=3.622$, df=2, $P=0.163$ |
| Female                      | 15 (44.1) | 14 (41.2) | 5 (14.7)  | 34 (100.0) |            |
There was a deficiency in the availability of emergency medication and kits at the dental clinics where the respondents practice. The most common drugs available were adrenaline (42.1%), glucose (35.1%) and epinephrine (28.1%) while other medication was virtually unavailable. This was in contrast to a German study where only 5% of their respondents did not have any emergency drugs or equipment. Dentists who are the main users of local anaesthetic agents should be well versed in diagnosis and management of emergencies that may arise from its use but should also have resuscitative equipment, oxygen and other emergency drugs which should be available for immediate use. The availability of resuscitative equipment has been deduced in the legal system as integral to the ability to perform basic life support; thus, training in the use of all resuscitative equipment and drugs is essential for their proper utilisation.\(^\text{[14]}\)

The students had deficiencies in their knowledge and confidence in performing the initial management of specific medical emergencies. Although syncope is the most frequently reported medical emergency, slightly over half of the participants had the right knowledge regarding the immediate action to take. Only 24.6% of the students in our study knew that they had to activate EMS urgently, even though about half of them knew the correct location of chest compression and the ratio of respiration to chest compressions in CPR, by a single rescuer in adult patients. This was similar to a study where only 32% of the participants chose to activate EMS as their immediate action.\(^\text{[10]}\) These results are also similar to those obtained by Laurent et al.,\(^\text{[7]}\) who found that final-year dental students were not capable of competently managing a cardiac arrest although more than half of these students considered themselves totally or sufficiently capable of carrying out CPR emergencies. The results are, however, in contrast to a British study where 95% of final-year dental students had confidence in the management of medical emergencies such as vasovagal syncope, myocardial infarction, angina, cardiac arrest, asthma, anaphylaxis and hypoglycaemia.\(^\text{[22]}\)

Furthermore, only 33.3% of our study respondents were knowledgeable about the actions to be taken on the management of airway obstruction during dental treatment due to aspiration of foreign body. Overall, 38.6% of the students had poor knowledge about medical emergencies while only 10.5% of the students had good knowledge. A cross tabulation of the knowledge and medical skills of the respondents shows that those with good knowledge had a higher proportion of respondents with good emergency medical skills. Emergency preparedness and knowledge were better amongst females and younger respondents.

A previous research that related clinical knowledge with actual practice observed that even though 68% of students independently identified the need for oxygen and the correct location of the equipment in the dental school, only 15% of them completed the resuscitative procedure in an optimal time frame.\(^\text{[21]}\) It also demonstrated that although most participants were able to verbalise the proper protocol for managing medical emergencies, the chairside was defective, highlighting the potential disconnect between instruction in the classroom and actual clinical practice. The researchers opined that performing routine simulated emergency drills bridges the gap between this disconnect and improves confidence in dental practitioners when it comes to emergency management.\(^\text{[23]}\)

### CONCLUSION

Although many of the dental students indicate that they had good emergency preparedness, an assessment of their knowledge showed that only 10.5% of the students had good knowledge about handling medical emergencies. The findings from our study point to a deficiency in the dental students’ curriculum with regard to medical emergencies which makes them inadequately prepared to handle them. This highlights the need for a review of curriculum as well as a modification in delivery style to a practical, hands-on teaching and emergency scenarios simulations to enhance the students’ skills and self-confidence in managing emergencies in a dental setting.

### Financial support and sponsorship
Nil.

### Conflicts of interest
There are no conflicts of interest.

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Table 5: Association between emergency preparedness and selected sociodemographics

| Age group (years) | Medical skills | Total | Statistics |
|-------------------|----------------|-------|------------|
|                   | Poor | Good |       |         |
| 20-24             | 12 (27.9) | 31 (72.1) | 43 (100.0) | $x^2=0.308$, $df=1$, $P=0.579$ |
| 25-29             | 5 (35.7) | 9 (64.3) | 14 (100.0) |         |

| Gender          | Medical skills | Total | Statistics |
|-----------------|---------------|-------|------------|
| Male            | 7 (30.4) | 16 (69.6) | 23 (100.0) | $x^2=0.007$, $df=1$, $P=0.934$ |
| Female          | 10 (29.4) | 24 (70.6) | 34 (100.0) |         |

Table 6: Association between knowledge of dental emergencies and medical emergency preparedness

| Emergency preparedness | Knowledge on medical emergencies | Total | Statistics |
|------------------------|----------------------------------|-------|------------|
|                        | Poor | Fair | Good |       |         |
| Poor                   | 8 (47.1) | 8 (47.1) | 1 (5.9) | 17 (100.0) | $F=1.015$, $df=2$, $P=0.602$ |
| Good                   | 14 (35.0) | 21 (52.5) | 5 (12.5) | 40 (100.0) |         |
REFERENCES

1. Atherton GJ, McCaul JA, Williams SA. Medical emergencies in general dental practice in Great Britain. Part 1: Their prevalence over a 10-year period. Br Dent J 1999;186:72-9.

2. Greenwood M. Medical emergencies in the dental practice. Periodontol 2000 2008;46:27-41.

3. Jodalli PS, Ankola AV. Evaluation of knowledge, experience and perceptions about medical emergencies amongst dental graduates (Interns) of Belgaum city, India. J Clin Exp Dent 2012;4:e14-8.

4. Handley AJ. Basic life support. Br J Anaesth 1997;79:151-8.

5. Adefarasin TE, Carrara CF, Oliveira FV, Santos CF, Oliveira TM. Evaluation of the dentists’ knowledge on medical urgency and emergency. Braz Oral Res 2014;28. pii: S1806-83242014000100240.

6. Elanchezhiyan S, Elavarasu S, Vennila K, Renukadevi R, Mahabob MN, Sentilkumar B, et al. Awareness of dental office medical emergencies among dental interns in Southern India: An analytical study. J Dent Educ 2013;77:364-9.

7. Laurent F, Augustin P, Nabet C, Ackers S, Zamaroczy D, Maman L, et al. Managing a cardiac arrest: Evaluation of final-year predoctoral dental students. J Dent Educ 2009;73:211-7.

8. Gbotolorun OM, Babatunde LB, Osisanya O, Omokhaeue E. Preparedness of government owned dental clinics for the management of medical emergencies: A survey of government dental clinics in Lagos. Nig Q J Hosp Med 2012;22:263-7.

9. Adewole RA, Sote EO, Oke DA, Agbelusi AG. An assessment of the competence and experience of dentists with the management of medical emergencies in a Nigerian teaching hospital. Nig Q J Hosp Med 2009;19:190-4.

10. Albelaihi HF, Alweneen AI, Ettish A, Alshahrani FA. Knowledge, attitude, and perceived confidence in the management of medical emergencies in the dental office: A Survey among the dental students and interns. J Int Soc Prev Community Dent 2017;7:364-9.

11. Girdler NM, Smith DG. Prevalence of emergency events in British dental practice and emergency management skills of British dentists. Resuscitation 1999;41:159-67.

12. Atherton GI, Pemberton MN, Thornhill MH. Medical emergencies: The experience of staff of a UK dental teaching hospital. Br Dent J 2000;188:320-4.

13. Clark MS, Wall BE, Tholström TC, Christensen EH, Payne BC. A twenty-year follow-up survey of medical emergency education in U.S. Dental schools. J Dent Educ 2006;70:1316-9.

14. Wilson MH, Mc Ardle NS, Fitzpatrick JJ, Stassen LF. Medical emergencies in dental practice. J Ir Dent Assoc 2009;55:131-43.

15. Ehigiator O, Ehizele A, Ugbedaga P. Assessment of a group of Nigerian dental students’ education on medical emergencies. Ann Med Health Sci Res 2014;4:248-52.

16. Zhou R, Haque Z. Awareness about BLS (CPR) among medical students: Status and requirements. J Pak Med Assoc 2009;59:57-9.

17. 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. Emerg Med J 2008;25:296-300.

18. Ghonza HF, Buso L, Jorge MA, Gonzaga LH, Chaves MD, Almeida OP, et al. Evaluation of knowledge and experience of dentists of São Paulo state, Brazil about cardiopulmonary resuscitation. Braz Dent J 2003;14:220-2.

19. Broadbent JM, Thomson WM. The readiness of New Zealand general dental practitioners for medical emergencies. NZ Dent J 2001;97:82-6.

20. Arsati F, Montalli VA, Flório FM, Ramacciato JC, da Cunha FL, Ceanho R, et al. Brazilian dentists’ attitudes about medical emergencies during dental treatment. J Dent Educ 2010;74:661-6.

21. Kalladka M, Greenberg BL, Padmashree SM, Venkateshiaht NT, Yalsangi S, Raghunandan BN, et al. Screening for coronary heart disease and diabetes risk in a dental setting. Int J Public Health 2014;59:485-92.

22. Bell G, James H, Kreczak H, Greenwood M. Final-year dental students’ opinions of their training in medical emergency management. Prim Dent J 2014;3:46-51.

23. Le TT, Scheller EL, Pinsky HM, Stefanac SJ, Taichman RS. Ability of dental students to deliver oxygen in a medical emergency. J Dent Educ 2009;73:499-508.