AWARENESS OF MEDICAL EMERGENCIES AND PREPAREDNESS OF UNDERGRADUATE CLINICAL DENTAL STUDENTS IN A TERTIARY INSTITUTION IN NIGERIA

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ABSTRACT

BACKGROUND: Medical emergency can be described as an unwanted, unexpected reaction or complication which usually requires immediate attention or intervention. Aim: This study aims to assess awareness and preparedness for medical emergencies amongst undergraduate clinical dental students at the University of Benin, Nigeria.

MATERIALS AND METHODS: A descriptive cross-sectional study involving all clinical dental students in the School of Dentistry, University of Benin. The questionnaire was divided into three main sections: Socio-demographic characteristics of the respondents; Self-assessed medical emergency preparedness among the respondents; Self-evaluation of knowledge of specific medical procedures about medical emergencies.

RESULTS: The age of the respondents ranged from 19 to 31 years, with a mean age of 24.49 ± 3.1 years. A higher proportion of the respondents were male (47; 72.3%). Seventy-two percent of students adequately assessed the patient's medical history, but only 40.0% regularly used medical Pro-forma to obtain the patients' health history. About 41.5% of the students had poor knowledge about medical emergencies, while 43.1% had adequate knowledge. Only 15.4% of the students had good knowledge.

CONCLUSION: The study showed that only 15.4% of the students had good knowledge of handling medical emergencies, although 69.2% of the dental students specified good emergency preparedness. The findings point to a deficiency in the dental students' curriculum regarding medical emergencies, which makes them inadequately prepared to handle them. This emphasizes the need for a review of clinical dental students' curricula to introduce the management of medical emergencies.

KEYWORDS: Medical emergencies, awareness, preparedness, Clinical dental students.

INTRODUCTION

Many situations in the dental office can provoke medical emergencies. The frequent administration of local anesthetics and other drugs, dental materials, the dental care of medically compromised patients, and the fear of surgical operations in many patients are frequent causes of emergencies such as syncope, hyperventilation, and cardiac arrest. [1] Medical emergencies can be any medical condition demanding immediate treatment[2] or an unwanted, unexpected reaction or complication that usually requires immediate attention or intervention. [3]
These emergencies include syncope, seizures, local anesthesia overdose, allergy, anaphylaxis, asthmatic attack, respiratory obstruction, etc. It can be challenging or distressing, especially to medical personnel who are not proficient in handling medical emergencies.[2-4] Pre-existing medical conditions may play a role in the troubles in the dental clinic, either directly or indirectly, through drugs prescribed to manage such conditions.[4] Furthermore, dental procedures may be associated with several risks, such as airway compromise and aspiration of instruments. Dental anxiety can also cause medical emergencies in several patients. Dentists must be aware of possible medical emergencies in practice and their signs, symptoms, and treatment.[3,5]

Lack of training and inability to manage medical emergencies can lead to serious consequences and legal actions.[6] Therefore, dental students must have appropriate knowledge of potential interactions with medical conditions and the ability to diagnose medical problems.[1,6] Since dentists are primarily responsible for the patient's welfare in the dental clinic, it is important that they are adequately trained in the effective management of emergencies, use of necessary drugs/equipment, and emergency procedures such as basic life support. These medical emergencies can be alarming in dental clinics to any clinical dental student, but these situations become relatively less alarming with adequate precautions and necessary training; clinical dental students must be aware and equipped to handle such events.[7]

Several 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.[2,8] A previous study highlighted a lack of content or training for emergencies in the undergraduate curriculum.[9] A study in Nigeria showed a lack of adequate preparation for emergencies in dental clinics owned by the government in Lagos State.[2] 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. [10]

The few studies that assessed the knowledge and competency about emergencies in dental clinics have been focused on dentists and interns.[2, 8, 11] Little is known about how much of this training is given to undergraduate dental students.[11] Although medical emergency in dental practice is rare, as reported in some studies,[2,8,10] when it occurs, they can pose a significant risk to the patient's life, especially if the dental surgeon is not prepared to handle such emergencies at the time of occurrence. It is thus important that dentists are trained and knowledgeable in managing these emergencies. This study, therefore, seeks to assess awareness and preparedness for medical emergencies amongst undergraduate clinical dental students at the University of Benin.

MATERIALS AND METHODS:

This was a descriptive cross-sectional study involving all clinical dental students (400 level to 600 level) in the School of Dentistry, College of Medical Sciences, University of Benin. Ethical approval for the study was obtained from the Health Research Ethics Committee of the University of Benin Teaching Hospital with protocol number: ADM/E/22/A/VOLVII/14830945.

The inclusion criteria included clinical dental undergraduate students who have passed bachelor of dental surgery pre-clinical examinations ((BDS) Part 1A and Part 1B) at the University of Benin. Participants who voluntarily declined not to partake in the study and pre-clinical dental students were excluded from the study. There was adherence to Helsinki Declaration with assent obtained from the participants. Participation was voluntary for all study participants, and they were informed that they were free to decline to enlist and withdraw from the study.

Data were collected using a pre-tested self-administered questionnaire adapted from a previous study.[3] The authors of this study approached students at the end of a lecture with prior permission duly obtained from the dean and concerned academic faculty. The study questionnaires were distributed to the students who made the study participants after their morning lecture sessions before they proceeded to their clinical postings and some others at their hostels. The questionnaires were collected from the students the same day immediately after completion. The principal investigator explained the purpose of the questionnaire, and its anonymous nature was emphasized. The questionnaire was divided into three main sections, namely: Socio-demographic characteristics of the respondents; Self-assessed medical emergency preparedness among the respondents, which had 'yes' or 'no' responses; Self-evaluation of specific medical procedures and clinical scenarios that assessed the competencies of the respondents about medical emergencies also had best option responses.

In assessing knowledge, one score was assigned for the correct option, and a score of 0 was given for wrong responses. For the 13 questions, the minimum and maximum possible scores were 0 and 13, respectively, graded as <5 as poor, 5-9 as fair, and >9 as good. This was adapted from Fasoyiro et al.[3] Ten questions were used to assess the self-assessed emergency preparedness of the respondents and using the mean value for dichotomy, scores ≤5 were rated as poor, or scores ≥6 were rated as good.

Data Analysis:

The data collected were tabulated and analyzed using the Statistical Package for the Social Sciences for Windows (version 25, Chicago, IL, USA) statistical software package. The results were expressed in proportion and percentages, while the Chi-square was used to test the association. Differences and associations were considered statistically significant where the associated P ≤ 0.05.

RESULTS:

The age of the respondents ranged from 19 to 31 years, with a mean age of 24.49 ± 3.1 years. A higher proportion of the respondents were male (47; 72.3%), and the majority were level 400 clinical dental students (38; 58.5%) (Table 1).

Table 1: Socio-demographic characteristics of respondents.(n=65)

Variable	Frequency, *n* (%)
Age group (years)	
16 – 25	43 (66.2)
26 – 35	22 (33.8)
Mean ± SD	24.49 ± 3.1
Gender	
Male	47 (72.3)
Female	18 (27.7)
Level	
400L	38 (58.5)
500L	12 (18.5)
600L	15 (23.1)
Ethnic group	
Bini	25 (38.5)
Yoruba	10 (15.4)
Igbo	17 (26.2)
Others	13 (19.9)
Religion	
Christian	63 (96.9)
Muslim	1 (1.5)
Others	1 (1.5)

Seventy-two percent of students adequately assessed the patient's medical history, but only 40.0% regularly used medical Pro-forma to obtain the patient's health history.

A little above an average proportion of the students (37; 56.9%) had attended lectures or training on emergency training or management program, while 78.5% (n=51) think that emergency conditions can be handled at the dental clinic. More than average of the respondents (43; 66.2%) obtained or had access to the vital medical signs before commencing treatment, but only 23.1% (n=15) felt adequate to give intravenous or intramuscular injections, and only 25.8% (n=25) of the respondents know about the dental emergency kit (Table 2).

Table 2: Self-assessed medical emergency preparedness amongst the respondents (n=65)

Medical skills (multiple responses)	Frequency (%)
Enquire about past medical history	47 (72.3)
Filled health history pro forma for the patients	26 (40.0)
Obtain or have access to the vital medical signs before commencing treatment	43 (66.2)
Attended lectures or training on emergency training or management program	37 (56.9)
Think emergency conditions can be handled at the dental clinic	51 (78.5)
Can give an intramuscular injection	15 (23.1)
Can give an intravenous injection	15 (23.1)
Know about the dental emergency kit	25 (25.8)
Know the contents of the emergency kit	13 (20.0)
Effecti vely use the dental emergency kit	8 (12.3)

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 excellent or poor preparedness, 45 (69.2%) of the respondents believed they had good medical emergency preparedness. In comparison, 20 (30.8%) assessed themselves as having poor skills (Figure 1).

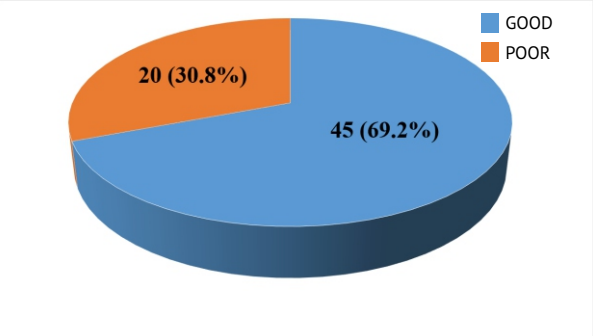


Figure 1: Grouping of self-assessed medical emergency preparedness.

As reported in Table 3, concerning the immediate action to take if a patient suffers from syncope when a dental procedure is commenced, more than half of the respondents (41; 63.1%) rightly stated that the patient should be placed in the supine position with the brain at the same level as the heart and feet elevated slightly. Only 46.2% (n=30) of the respondents accurately knew that immediate action when a patient has an anaphylactic reaction during a dental procedure is to stop the administration of all agents likely to cause anaphylaxis. On participants' knowledge regarding immediate action in patients with epileptic seizures during a dental procedure, 50.8% (n=33) of the respondents accurately ticked dental procedure is stopped and placed the patient in a supine position away from harmful equipment and instruments. And regarding immediate action in patients with airway obstruction during dental treatment due to foreign body aspiration, 33.8% (n=22) accurately ticked all of the above options (attempt Heimlich/triple maneuver, examine the mouth and local area). Only 6 (9.2%) 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). About 64.6% (42) of the respondents knew the abbreviation of BLS to be Basic Life Support. About the correct location of the chest, 32.3% (21) of the respondents accurately knew the location of chest compression, which is the xiphisternum, and only 24.6% (n=16) knew the accurate ratio of cardiopulmonary resuscitation (CPR) for rescuers in adult patients is 30:02. (Table 3).

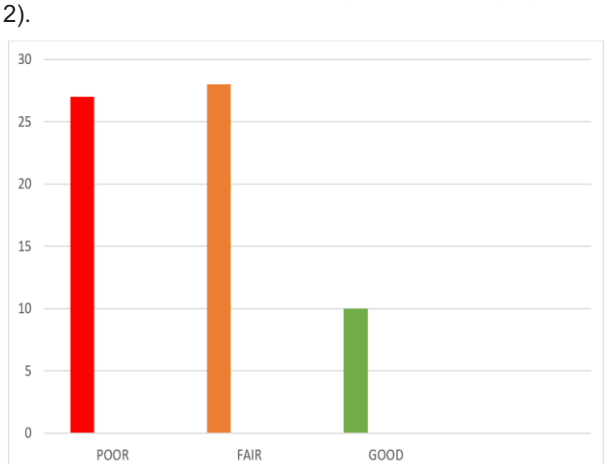
Table 3a: Self-reported knowledge about medical emergencies amongst the respondents (n=65)

Variable	Frequency (%)
Immediate action if patients suffer from syncope when a dental procedure is commenced.	
- Continue the dental procedure.	3 (4.6)
- Place in supine (horizontal) position with the brain at the same level as the heart and feet elevated slightly (10 -15 degree angle).	41 (63.1)
- Make the patient to stand.	0 (0)
- Don't know	21 (32.3)
Immediate action when a patient has an anaphylactic reaction during a dental procedure.	
- Ask the assistant to call for an ambulance immediately.	4 (6.2)
- Stop administration of all agents likely to cause anaphylaxis.	30 (46.2
- Administer adrenaline.	I don't
- Don't know.	19 (29.2)
Immediate action when a patient falls into an asthmatic attack.	
- Discontinue ongoing dental treatment and check if patients came with their inhaler; this should be used.	45 (69.2)
- Administer adrenaline subcutaneously.	4 (6.2)
- Nurse patient in a semi -erect position.	2 (3.1)
- I don't know.	14 (21.5)
Immediate action in patients with epileptic seizures during a dental procedure.	
- The dental procedure is stopped and places the patient in a supine position away from harmful equipment and instruments.	33 (50.8)
- Phenobarbitone (100-200 mg I.M. /I.V.) or phenytoin (25 -50 mg/min in a running saline I.V. line).	11 (16.9)
- Attempt to force the patient's mouth open or place any object in the mouth.	0 (0)
- Don't know.	21 (32.3)
Immediate action for a patient that is bleeding after a dental procedure.	
- Search for the cause of bleeding.	6 (9.2)
- Apply pressure on the bleeding site.	8 (12.3)
- All of the above.	32 (49.2)
- Don't know.	19 (29.2)
Immediate action in patients with airway obstruction during dental treatment due to foreign body aspiration.	
- maneuver	13 (20.0)
- Examine the mouth and the local area.	1 (1.5)
- All of the above.	22 (33.8)
- Don't know.	29 (44.6)

Table 3b: Self-reported knowledge about medical emergencies amongst the respondents (n=65)

Variable	Frequency (%)
Immediate action after confirming patient is not responding even after shaking and shouting.	
- Start CPR.	30 (46.2)
- Activate EMS	6 (9.2)
- Observe.	1 (1.5)
- Don't know.	28 (43.1)
Planning for extraction of a tooth in patients with a prosthetic heart valve.	
- Advise antibiotic prophylaxis.	14 (21.5)
- Advise the patient to take consent from the general physician.	3 (4.6)
- All of the above.	22 (33.8)
- Don't know.	26 (40.0)
Abbreviation of BLS	
- Best life support.	2 (3.1)
- Basic Life Support.	42 (64.6)
- Basic life services	0 (0)
- Don't know.	21 (32.3)
Location of chest compression	
- The left side of the chest.	11 (16.9)
- The right side of the chest.	2 (3.1)
- Xiphisternum.	21 (32.3)
- Don't know.	The ratio
The ratio of CR for single rescuers in adult patients.	
- 15:02	2 (3.1)
- 30:02	16 (24.6)
- 15:01	1 (1.5)
- Don't know	46 (70.8)
The ratio of CPR for double rescuers in paediatric patients.	
- 15:02	8 (12.3)
- 30:02	3 (4.6)
- 15:01	8 (12.3)
- Don't know	46 (70.8)
Other options if you don't want to give mouth to mouth CPR	
- Chest compression-only.	2 (3.1)
- Bag-mask ventilation with chest compression.	28 (43.1)
- No CPR	0 (0)
- Don't know.	35 (53.8)

In assessing the knowledge of students' scores, 41.5% of the students had poor knowledge about medical emergencies, while 43.1% had fair, adequate knowledge. Only 15.4% of the students had good knowledge (Figure 2).



Poor – 27(41.5%), Fair – 28 (43.1%), Good – 10 (15.4%)..

Figure 2: Grouping of self-assessed knowledge about medical emergencies

Although not statistically significant, on checking the percentages, females and older students aged between 26 and 35 years had more respondents with good knowledge of dental emergencies than males and those aged between 16 and 25 years. The level 500 and 600 classes had more respondents with good knowledge than the level 400 class. This was statistically significant [Table 4].

Table 4: Association between knowledge about medical emergencies and selected socio-demographics.

	Knowledge about emergencies			Total	Statistics
	Poor	Fair	Good		
Age group(years)					
16 – 25	20 (46.5)	17 (39.5)	6 (14.0)	43 (100.0)	F=1.296, df=2,
26 – 35	7 (29.2)	11 (45.8)	4 (25.0)	22 (100.0)	P=5.230
Gender					
Male	20 (42.6)	22 (46.8)	5 (10.6)	47 (100.0)	X^2=3.076, df=2
Female	7 (38.9)	6 (33.3)	5 (27.8)	18 (100.0)	*P*=0.215
Class (Level)					
400	24 (63.2)	13 (34.2)	1 (2.6)	38 (100.0)	F=23.605, df=4
500	3 (25.0)	5 (41.7)	4 (33.3)	12 (100.0)	*P*<0.001
600	0 (0.0)	10 (66.7)	5 (33.3)	15 (100.0)	

DISCUSSION

Although medical emergencies are often considered to be relatively rare in the dental setting, a necessary part of dental care is the need to be able to manage medical emergencies when they arise. In the present study, males constituted a higher proportion of the respondents making up 72.3% of the clinical dental students, a trend in medical schools where males continue to increase in proportion in annual enrolment. The majority of the respondents stated that they adequately assessed the patient's medical history, but only 40.0% regularly used a medical pro forma to obtain it. This was lower than the value obtained in a previous study where 64.9% of respondents recorded their patients' medical history, including medications and allergies, before dental treatment.[3] Since attention to detail varies depending on the clinician attending to the patient and 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 recognizing 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.[12]

In the present study, 56.9% of the students had attended lectures or training on medical emergencies; this contrasts with previous studies, which recorded 78.9%.(3,10) This study found that 43.1% of the students have never received training on managing medical emergencies, similar to an earlier report from the same study location.(13)

Studies in various countries have revealed that dental surgeons were not confident about managing medical emergencies[14,15] and that many have never had any form of practical training in resuscitation.[14]
Most dentists opined that further training was needed and that hands-on courses would improve their preparedness.[16] Most of our study respondents (66.2%) claimed to obtain or have access to the vital medical signs before treatment, and only 23.1% felt adequate to give intravenous or intramuscular injections. This was in contrast with a Brazilian study where the majority of respondents judged themselves capable of giving intramuscular or subcutaneous injections.[17] 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.[18] They, however, may need to be further trained in the skill of venipuncture.
There was a deficiency in the knowledge of the availability and contents of emergency kits at the dental clinics where respondents practice. This was in contrast to a German study,[15] where only 5% of their respondents did not have any emergency drugs or equipment. Clinical dental students who are future dentists should be well-versed in diagnosing and managing emergencies that may arise in the dental clinic and have resuscitative equipment, oxygen, and other emergency drugs available for immediate use. The legal system has deduced the availability of resuscitative equipment as integral to performing basic life support; thus, training in all resuscitative equipment and drugs is essential for their proper utilization.[12]

The students had deficiencies in their knowledge and confidence in performing the initial management of specific medical emergencies, as reported in table 3. 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 9.2% of the students in our study knew that they had to activate EMS urgently; less than half knew the correct chest compression location and the ratio of respiration to chest compressions in CPR by a single rescuer in adult patients. This was less than obtained from a study where 32% of the participants chose to activate EMS as their immediate action.[12] These results are also similar to those obtained by Laurent et al.; 2009, 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. However, the outcomes of these results are similar but to a varying degree to previous studies.[9,19]

Furthermore, only 33.8% of our study respondents were knowledgeable about the actions to manage airway obstruction during dental treatment due to foreign body aspiration. Overall, 41.5% of the students had poor knowledge about medical emergencies, while only 15.4% had good knowledge. This suggests that more intense training in managing medical emergencies for clinical dental students is needed.

Concerning medical emergency preparedness, the present study shows that only 23.1% of the clinical dental students felt adequate to give intravenous or intramuscular injections, and only 25.8% of the respondents know about the dental emergency kit. Previous research 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.[20] It also demonstrated that although most participants could verbalize the proper protocol for managing medical emergencies, the chairside was defective, highlighting the potential disconnect between instruction in the classroom and actual clinical practice.[20]

This study reported in table 4 that the level 500 and 600 students were more knowledgeable about medical emergencies than the first-year (level 400) clinical students. This is expected because the higher the level, the more students' exposure to medical emergencies. And emergency medicine curriculum is taught at the 500 level, so the 1st year (400 level) clinical students are not exposed to emergency medicine theoretically. This was also the case in a previous study which stated that the scale of knowledge was, as expected, the lowest among the 4th-year students in their study.[21] Nevertheless, among the 2nd (500 level) and 3rd (Level 600) clinical years students exposed to emergency medicine in the present study, only 33.3 % had good knowledge of medical emergencies, as indicated in Table 4.
It has been suggested by Le TT et al.; 2009,[20] that performing routine simulated emergency drills bridges the gap between this disconnection and improves confidence in dental practitioners when it comes to the management of medical emergencies. Dentists treat a wide range of patients, including patients with compromised health conditions. While rendering treatment, various medical emergencies can and do occur.[22] To help increase the knowledge required to manage such emergencies, dental students must be trained while in dental school.

CONCLUSION

The present study showed that only 15.4% of the students had good knowledge about handling medical emergencies, although 69.2% of the dental students specified that they had good emergency preparedness. This emphasizes the need for collaborative, hands-on training in medical emergencies in the existing dental undergraduate curriculum globally.

CONFLICTS OF INTEREST: The authors declare no conflicts of interest.

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