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Knowledge, Attitude and Perceived Confidence of USIM Dental Graduates Towards Management of Medical Emergencies

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Abstract — Medical emergencies can be alarming to any clinicians, but these situations can be managed well if proper preparation has been made. The objectives of this study are to evaluate USIM dental graduate's knowledge in dealing with medical emergencies in dental practice, to assess perceived level of competency of USIM dental graduate's in dealing with medical emergencies in dental practice and to determine the need for further improvement in medical emergencies undergraduate training. A standardised questionnaire form consisting of demographic data, experience, knowledge and perceived level of competency of dental practitioner in dealing with medical emergencies were distributed to USIM dental graduate. 123 respondents answered the online questionnaire. Around 58.5% of them had experienced medical emergencies during dental treatment. All of them answered correctly on management of hypoglycaemia but only 44.7% answered correctly on management of unresponsive patient and 65% answered correctly on position of syncope patient. Most of the respondents were not confident in administrating intravenous medication (46.3%), handling foreign body aspiration (24.4%) and using Automated External Defibrillator (AED) (38.2%). This study can be used to guide further improvement in medical emergency training for undergraduates and enhancing the proficiency level of the USIM dental graduates.

Keywords — dental setting; medical emergency; undergraduate training

I. INTRODUCTION

Information gathered from current studies showed that medical emergencies in dental settings are quite frequent [1-3]. Incidence of medical emergencies was reported as 2 events per dentist per year [4] Invasive dental procedures can generate stress in patients and may resulted in microcirculatory changes [5]. Dental practitioners must always be aware of the possible disturbances in vital signs readings during invasive dental

treatment that increase the risk of developing medical emergencies especially in a patient with a known compromised dental status. Non-communicable diseases such as diabetes, high cholesterol and hypertension are the major risks factors for cardiovascular disorder. 1.7 million people in Malaysia currently live with these three major risk factors while 3.4 million residents currently live with two major risk factors [6]. These increased prevalence of medical problems in the

population may directly increase the possible risk of dental patients developing medical emergencies during dental treatment. On the other hand, there's also a possibility of an undiagnosed patient coming to the dental clinic unaware of their existing medical problems, leading to life-threatening complications [7]. This information clearly alarmed us to design a proper response in dealing with unexpected medical emergencies while performing dental visits as we are treating more patients with complicated medical problems.

Among the common medical emergencies that occur in dental settings are listed in Table I. Risk assessment of a patient's condition may draw the dental practitioner's attention to any potential medical emergencies that may arise during

their dental visits [8]. During such an emergency situation, dental practitioners and their teams need to be skillful and confident in managing their patient to initiate an effective initial emergency treatment. Lack of training, inability to cope and failure to identify medical emergencies during dental visits can lead to tragic consequences and sometimes legal action. As a health care professional, a dental practitioner must be able to provide first aid until the arrival of help for subsequent management.

Studies on knowledge and perceived competencies among dental undergraduates and dental practitioners showed the insufficient preparedness in managing medical emergencies during dental visit [1, 9].

TABLE I
COMMON MEDICAL EMERGENCIES (ME) IN DENTAL SETTING

Author	Common ME
Smereka et al., 2019 [1]	Vasovagal syncope, orthostatic hypotension, hyperventilation crisis, mild allergic reaction, hypoglycaemia, seizure.
Šoštarič, M., & Umek, N., 2018 [2]	Syncope, hypoglycaemia, anaphylaxis, hypertensive crisis, seizure, airway obstruction, acute coronary syndrome
Mohamed Ramli et al., 2019 [16]	Syncope, epilepsy, hypoglycaemia, inhaled foreign body, myocardial infarction, anaphylaxis
Alhamad et al., 2015 [3]	Vasovagal syncope, orthostatic hypotension, adverse drug reaction, asthma attack, foreign body aspiration, seizures
Muller et al., 2008 [25]	Vasovagal syncope, hypertensive crisis, seizure, hypoglycaemia, asthma, acute coronary syndrome, anaphylaxis, airway obstruction
Girdler et al., 1999 [26]	Vasovagal syncope, angina, epileptic fit, hypoglycaemia, asthma, choking, anaphylaxis, cardiac arrest

Dental undergraduates' curriculum in Malaysia is outlined by the professional bodies, Dental Dean's Council. Each university that offers dentistry courses will design the curriculum and will be accredited by the Malaysian Qualification Agency (MQA). It is imperative for dental students to attend a Basic Life Support Training (BLS) course as the minimum clinical experience prior to graduation [10].

Faculty of Dentistry, Universiti Sains Islam Malaysia (USIM) is the 8th public dental faculty in Malaysia, it was founded in 2007 and have produced 35 dental graduates each year since 2012. Topics related to the management of common medical emergencies such as syncope, allergic reaction, orthostatic hypotension and management of hypoglycaemic patients were taught (lectures and seminars) in Oral & Maxillofacial Surgery course during the fourth and fifth academic year [11]. The students will attend BLS courses in their third academic year right before they enter the clinical years. The BLS course is conducted by certified instructors and includes theory and practical examination. However, hands on session in managing more common medical emergencies in dental settings was not included as a part of BLS course.

This study is aimed to evaluate USIM's dental graduates' knowledge and perceived level of competency in dealing with medical emergencies in dental practice as well as to determine the need for further improvement in medical emergencies undergraduate training.

II. METHODOLOGY

This descriptive study was conducted from November 2020 until early February 2021. A total of 280 USIM's dental graduates (graduates from 2012-2019) were contacted through WhatsApp® application. Confidence level was set at 95% with a 5.0% margin of error. The sample size calculated was 162.

A questionnaire adapted from Stafuzza et al., 2014 was developed to achieve each component of the research's objectives [12]. The questionnaire comprises of five sections with several closed ended questions and several multiple-choice questions. The first section of the questionnaire gathered the demographic information of the dental graduates. The second section of the questionnaire focused on the assessment of dental graduates experienced in handling

medical emergencies and information regarding basic life support training and their opinion on the importance of knowledge in medical emergencies management. Subsequently, the third section evaluated the dental graduate's knowledge on medical emergencies management in dental practice. The fourth section assessed the perceived level of competency of the dental alumni in dealing with medical emergencies events in their dental practices using a four-scale rating on the list of procedure provided. The final section of the questionnaire identified the need for further improvement in medical emergencies training

The questionnaire was then pre-tested to evaluate its credibility and to assess respondents' comprehension of the questions given. Several changes were made to the questionnaire to facilitate the samples' responses and upon advice from content expert Basic Life Support (BLS) instructors and Oral & Maxillofacial Surgeons. The questionnaire was then distributed among the respondents through google form including the study information and a consent form. Prior to the commencement of this study, an ethical approval was obtained from the Medical Ethics Committee, Universiti Sains Islam Malaysia (USIM/JKEP/2020-111) All the data obtained were analysed descriptively using Statistical Programme for Social Science (SPSS) version 22.0 (SPSS Inc., 1999). Categorical variables were calculated as mean, frequency and percentages.

III. RESULTS AND DISCUSSION

A. Background data

A total of 123 respondents agreed to participate in this study. The questionnaire results are tabulated in the Table II. 75.9% response rate was calculated based on the original sample size. Around one quarter of respondents were male and majority of them were working in government sector. Surprisingly more than half of them have experienced medical emergencies while treating patients. Only 13% of the respondents had renewed their BLS certificate for the last one year.

Review of the curriculum for undergraduates teaching involves getting feedback from the alumni regarding the course provided. A continuous quality improvement is important in the betterment of both theory and practice of pedagogy and the process of teaching. Currently, in our curriculum, this subject was taught theoretically by a series of lectures and seminars sessions. A total of 3 contact hours of teaching for the topic of "Management of medical emergencies in dental practice" were allocated under the course of Oral and Maxillofacial Surgery in the fourth academic year [11]. As stated earlier, common medical emergencies in dental setting were not covered in the current BLS module. The BLS module used for training mainly focuses on cardiac emergency events. BLS course comprised of a two day long sessions during the Introduction Week for Year 3 undergraduate teaching at the beginning of their clinical years. At the end of the course, the students will have to sit for the written and practical examination. Remedial examination is conducted for those who fail the examination. In France, dental students are required to undergo a total of 70 hours training in emergency care which includes lectures and practical workshops on inert manikins throughout a 4 years duration [13]. Dental practitioners are expected to handle medical

emergencies that occur while patient is under their care, thus it is very important for a dental academician to incorporate the training of the common medical emergencies management. Whatever levels of skills in managing medical emergencies the Dental Council may require, public expectations are likely to be higher.

TABLE II
BACKGROUND OF RESPONDENT

Data	Percentage
Gender	Female: 76.4% Male: 23.6%
Year of graduation	2012: 4 (3.3%) 2013: 18 (14.6%) 2014: 7 (5.7%) 2015: 12 (9.8%) 2016: 13 (10.6%) 2017: 6 (4.9%) 2018: 18 (14.6%) 2019: 45 (36.6%)
Sector of practice	Government: 72.4% Private: 14.6% Academic center: 13%
Experience in handling ME	Never: 41.5% 1: 22.8% 2: 12.2% 3: 4.9% More than 3: 18.7%
Last BLS	Within one year: 13% 1-2 years: 23.6% 2-3 years: 22.8% More than 3 years: 40.7%

More than half of the respondents have experienced medical emergencies in our study. This information is concerning as it shows that medical emergency in dental setting is not uncommon. Previous study reported various range of frequency involving medical emergencies and it is difficult to specify as each study estimated the frequency based on different time frame, but it can be presumed that medical emergencies does happen more frequent that we think [1-3]. Even in this study, half of the respondent have encounter dealing with medical emergency though out their working experience.

It is quite a concern that most of the dental graduates in this study last attended their BLS course more than 3 years previously. Skills such as BLS, airway management and defibrillation will deteriorate significantly within six months of initial training [14]. Regular practice will ultimately result in increase of confidence performing emergency management skills such as CPR [15]. As a practising dental practitioner, we are expected to keep on improving our skills and knowledge by attending courses from time to time.

B. Knowledge in medical emergencies management

Five questions were asked under this section to specifically assess the knowledge of each practitioner on several medical emergencies management including syncope, unresponsive patient, anaphylaxis, hypoglycaemia and angina attack. The performance of the respondents for each question are tabulated in Table III. Most of the questions were answered correctly. The question with the most correct answer was regarding the management hypoglycaemia (100%). Question about the immediate management of unresponsive patient got the least correct answers of 65.3% incorrect answers.

All of the dental graduates were able to answer correctly for the management of medical emergencies involving hypoglycaemic condition and almost all of them were aware of the management of suspected angina attack. These two

conditions were among the common medical emergencies that can happen in dental clinic [2, 16]. Contrarily, more than half of them answer incorrectly on the management of unresponsive patient. In the chain of survival flow, whenever we recognize any early signs of medical emergencies, a call for help must be made which is the activation of Emergency Response System (ERS) [17]. As for management of anaphylaxis, several of them were still confused on epinephrine as the first medication that need to be administered. Data from previous studies also stated that many of the dental practitioners have low to moderate knowledge on medical emergencies [12, 18]. This call for improvement of training of the dental practitioners particularly in this topic as we are responsible to handle early medical emergencies management while patient is under our care.

TABLE III
PERCENTAGE OF RESPONDENT ANSWER CORRECTLY FOR QUESTIONS ON KNOWLEDGE OF MANAGEMENT OF MEDICAL EMERGENCIES IN DENTAL SETTING

Questions	Correct answer (n)
What is the position for patients suffering from syncope on dental chair?	65%
What is the first action in dealing with unresponsive patients?	44.7%
Which of the following is the first drug in case of anaphylaxis?	65%
During performing scaling on a diabetic patient, suddenly the patient start sweating and trembling. What is your management?	100%
What is the first suitable medication to administer if patient suspected to have angina attack during dental treatment?	99.2%

C. Perceived level of competency of dental graduates in dealing with medical emergencies in dental practice.

The perceived competency level of the respondents in dealing with medical emergencies are shown in Table IV. Most of the respondents are very confident in measuring vital signs (80.5%) compared to other procedures. Meanwhile, the highest rate of response for the procedure that they were not confident at all to perform was on how to use AED (14.6%). Only 28.4% of respondent were confident in giving intramuscular medication. Even though they have been to BLS courses, but only 19.5% of them perceived themselves as competent doing CPR.

Regarding perceived level of competency among dental graduates in management of medical emergencies, the majority of them were confident in their ability to measure vital signs. This may be due to the fact that measuring vital sign is a relatively less complicated procedure and has been repeatedly done throughout the years. It is quite worrying of the fact that many of them doubt themselves in performing CPR, Heimlich manoeuvre and handling of aspiration cases. Despite dental practitioners have been exposed to BLS during undergraduate training, they were still not confident in performing it. The more a dental practitioner is trained, the more competent they consider themselves [19]. As for the administration of drugs by intramuscular route, it is important that every dental practitioner have confident performing it. This is because it is the recommended management for unconscious hypoglycaemic patients in dental settings [20]. Automated external defibrillator (AED) is one of the most important

emergency equipment strongly recommended for every dental clinic to have [21]. Majority respondent in this study were not confident in handling AED. Early defibrillation in an event of cardiac arrest has been proven to improve patient's survival rate [22]. It is an easy-to-use medical device which is essential in the cases of sudden cardiac arrest. A previous study showed that majority of dental practitioners did not use AED in a situation when it was indicated [23].

D. Topics need to be included in medical emergencies training.

Large majority of the respondents agreed that administration of intravenous drugs, recognizing early signs and symptoms of medical emergencies (hypoglycaemic, syncope, chest pain), management of foreign body aspiration (dental material), and a guide on automated external defibrillators (AED) to be added in the future course for management of medical emergencies in dental practice.

Roy et al, 2018 have proven that students benefited from simulation training in medical emergencies and they feel better handling it [13]. It is also suggested that this kind of training to be included in the dental undergraduate curriculum. Realistic simulation and role play training act as effective adjunct to lecture and favoured by students [24]. Having well-trained dental professionals in all aspects of patient management should be the aimed for every dental undergraduate curriculum.

TABLE IV
PERCEIVED CONFIDENT ON MEDICAL EMERGENCY SKILLS

Skills	Yes, I can perform confidently	Maybe I am able to perform	Not sure	No confident at all
Cardiopulmonary resuscitation (CPR)	19.5%	65%	8.9%	6.5%
Measuring vital signs	80.5%	19.5%	-	-
Handling situation of aspiration of a foreign body	26.8%	48.9%	21.1%	3.2%
Heimlich maneuver	31.7%	52.8%	10.6%	4.9%
Administration of intramuscular medication	28.4%	45.5%	29.3%	8.9%
To use automated external defibrillators (AED)	16.3%	45.5%	23.6%	14.6%

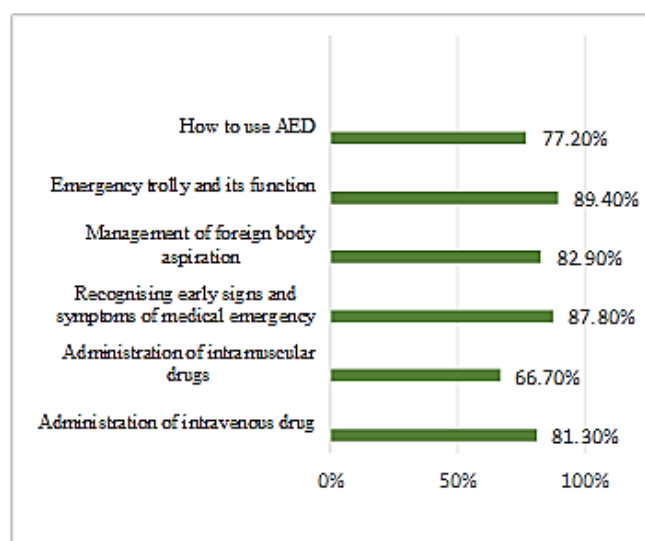


Fig. 1 Practical topics to add on into the teaching course.

IV. CONCLUSIONS

This study discovered that among USIM dental graduates shows moderate level of knowledge in medical emergencies management. Large numbers of them have low to moderate level of perceived competency in medical emergencies management and all of them agree with the need for further improvement in medical emergencies training which includes airway management, recognizing early signs and symptoms of medical emergency, management of aspiration of foreign body (dental material), management of epilepsy and how to use automated external defibrillators (AED).

It is suggested to improve undergraduate dental training on simulation and hands-on session on common medical emergencies during dental setting to enhance the proficiency level of the USIM dental graduates.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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