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Research Article

Basic Life Support Knowledge: A Comparative Study among Dental Students, Interns, and Faculty at King Khalid University College of Dentistry-Abha, Saudi Arabia

Lamia Abdullah Alkodari, Roa'a Mubarak Zafer, Bashaier Hanash Alshehri, Elham Abdullah Refeidi and Rafi A Togoo*

Department of Pediatric Dentistry and Orthodontic Sciences, King Khalid University Abha, Saudi Arabia

***Corresponding Author:** Rafi A Togoo, Department of Pediatric Dentistry and Orthodontic Sciences, King Khalid University Abha, Saudi Arabia.

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Abstract

Background: BLS provided by a dentist or dental assistant at the right time in dental settings is sometimes essential for decreasing mortality associated with frequent medical emergencies. So accurate knowledge and skills in this regard must be an essential part of dental education and it should be kept up to date with varying protocols.

Aim: To assess and compare the level of knowledge and attitude toward basic life support among bachelor of dental surgery clinical students (third-, fourth-, and fifth-year sixth-year dental students), dental interns, post-graduate students, and faculty in the Dental College at King Khalid University, Abha, Saudi Arabia.

Materials and Methodology: A questionnaire survey consisting of 03 screen and 16 core questions on BLS was prepared, which was independently reviewed by three doctors to ensure the questions' clarity and readability. For measuring construct validity, factor analysis was performed. The survey forms were distributed, and the participants were instructed to fill the questionnaire within a day of receiving it. After completing the study, the data were tabulated and subjected to descriptive analysis using IBM SPSS version 20.0 software.

Results: Overall response rate was 90.93%. Out of the total respondents', 45.18% were males, and 54.82% were females. Maximum participation was seen from 4th year BDS students (18.67%). The majority of participants (50.30%) had not attended BLS workshops in the past. 79.81% of respondents rightly ticked the abbreviation of BLS. Almost half of the participants identified the correct chest compression rate (100/min), while only 34.33% rightly know the depth of chest compression (1 - 1.5 inch) in adults during BLS. 53.01% of respondents were not reluctant to perform CPR on a stranger. More than 50% of participants rated themselves with insufficient knowledge of BLS and 93.37% of participants thought that General dental practitioners, dental students and staff should know about BLS, and it should be included in the dental curriculum.

Conclusion: The study demonstrated that dental students and staff of King Khalid University Dental College and a general dental practitioner of Abha, Saudi Arabia had inadequate knowledge and attitude towards BLS.

Keywords: *BLS Knowledge; Attitude; Dental Students; Medical Emergency*

Introduction

Our life is affected by various factors like socioeconomic status, education, occupation, and health status. Medical conditions like stroke, congestive cardiac failure, and myocardial infarction can lead to an individual's death [1]. These fatal systemic conditions can manifest as medical emergencies in the dental clinic. Although the incidence of emergency events has been observed to be rare in a dental practice, when it happens, it leads to a life-threatening situation. The commonly encountered medical emergencies are seizures, angina, anaphylaxis, choking, asthmatic attack, hypoglycaemic shock, and vasovagal syncope. Vasovagal syncope is the most common medical emergency reported in general practice. The other adverse events are reported at a rate of 0.7 cases per dentist per year [2].

There are different ways by which we can prevent the incidence of death due to these medical conditions leading to cardiac arrest in the dental set-up. Basic life support (BLS) is one of the most effective ways to prevent the associated morbidity/mortality with cardiac arrest [3]. BLS is based on the principle of maintaining adequate airway and supporting circulation and breathing without the use of any equipment [4]. When a patient encountered an obstructed airway, cardiac, or respiratory arrest in a dental clinic, dental practitioners need to act quickly using Basic Life Support (BLS) skills. BLS is an imperative part of the cardiopulmonary resuscitation (CPR) that consists of maintenance of adequate circulation and ventilation in case of cardiac or respiratory arrest [5].

Awareness and knowledge of BLS and expertise in CPR techniques warrant patient survival until the qualified medical help turns up. Management of medical emergencies in the dental clinic is the responsibility of the dentist. The inadequate level of training and incapability to manage medical emergencies can cause disastrous results and even legal problems. Hence dentists should be well prepared to handle medical emergencies.

In case of emergency, ample knowledge and awareness about BLS and CPR are required so that dental professionals can deliver necessary life-saving measures to patients. In many countries, it is mandatory to do the BLS training course, so that health care professionals should be skilled and convinced to resuscitate from the very beginning of their courses [6].

Many studies have been conducted to evaluate the level of knowledge about BLS among medical and dental students [1,7]. With this background, the present cross-sectional survey was planned to determine dental students' and staff's knowledge and attitude towards BLS at King Khalid University, Abha, Saudi Arabia.

Materials and Methods

Study design

A questionnaire-based survey (03 screener questions and 16 core questions) was conducted to assess the awareness regarding 'Basic Life Support' among third-, fourth-, and fifth-year dental students, dental interns, and staff of King Khalid University, Abha, Saudi Arabia. The last two questions were about rating the participant themselves on BLS knowledge (poor, below average, average, good, and excellent) and reason for the lack of knowledge (busy curriculum, lack of interest, and no professional training). The survey was also translated into Arabic and validated in a pilot study involving 47 Arabic-speaking participants was checked. The survey was conducted between June 2018 to September 2018. The study protocol was reviewed and approved by the Ethical board of King Khalid University, Abha, Saudi Arabia (SRC/REG/2016-2017/149). It was conducted following the ethical principles for medical research involving human subjects of the Helsinki Declaration. Confidentiality was maintained through the process. The inclusion criteria for the subject's participation in the study consisted of: 1. BDS student or intern or staff of King Khalid University, Dental College, Abha, Saudi Arabia. 2. General dental practitioner from Abha, Saudi Arabia 3. Age should not be less than 17 years. The participants, who were not willing to participate, incompletely filled forms, and participants having age less than 17 years were excluded.

The questionnaire was independently reviewed by 3 doctors (1 chief physician and 2 deputy-chief physicians of King Khalid Hospital, Abha Saudi Arabia) to ensure the questions' clarity and readability. For measuring construct validity, factor analysis was performed, which revealed that 16 core questions explained 78% of the variance. To assess the questionnaire's reliability, 37 randomly selected participants' responses were tested–retested, and scores showed a correlation of 88% in the Spearman correlation coefficient, and the split-half correlation was 79.8%.

Survey instrument

The questions were incorporated in the survey form after going through various literature related to that. The participants were supposed to fill the questionnaire within a day of receiving it. At least two reminders were given to all the participants after 1 day after distributing the survey form, who did not respond in the stipulated allotted time. The answers were received on the next day of the survey.

Statistical analysis: After completing the study, the results were segregated and compared between the Staff and BDS students, Dental Interns. The data were tabulated and subjected to descriptive analysis using IBM SPSS version 20.0 software. Statistical analysis was performed using Mann-Whitney U-test. The results with $P < 0.05$ were considered statistically significant.

Results

A total of 386 'Knowledge and Attitude of BLS questionnaire form' were distributed, 351 subjects responded with an overall response rate of 90.93%. Out of 351 responses, 19 were excluded because of incomplete or late questionnaire replies and participation age of less than 17. So, a total of 332 responses were finally considered for further analysis.

Table 1 showed the distribution of the demographic parameters of participants (n = 332). Out of the total respondents', 150 (45.18%) were males and 182 (54.82%) were females. The study sample was divided into eleven groups according to the different academic levels. The maximum participation was seen from 4th year BDS students (18.67%) followed by dental interns (18.07%), 5th year BDS students (16.26%), 6th year BDS students (14.45%), Assistant professors (10.54%), 3rd year BDS students (9.04%), General practitioners (5.12%), post-graduate dental student (3.33%), Dental Assistant (1.81%) and least from Associate professors (0.30%). Also, based upon the dental specialty, (n = 99) orthodontists participated maximum in the BLS survey (13.13%) with the least presentation from community dentist (1.01%).

Variables		No. of subjects	Percentage
Gender (n = 332)	Male	150	45.18
	Female	182	54.82
Academic level	3rd yr dental student	30	9.04
	4th yr dental student	62	18.67
	5th yr dental student	54	16.26
	6th yr dental student	48	14.45
	Assistant professor	35	10.54
	Associate professor	1	0.30
	Dental assistant	6	1.81
	Dental intern	60	18.07
	General practitioner	17	5.12
	Lecturer	8	2.41
	Post graduation dental student	11	3.33

Specialty (if applicable) (n = 99)	Dental assistant	11	11.11
	Community	1	1.01
	Endodontic	12	12.12
	Oral medicine	10	10.11
	Orthodontist	13	13.13
	Pathology	2	2.02
	Pedodontics	7	7.03
	Periodontics	8	8.03
	Prosthodontic	11	11.11
	Restorative	12	12.12
	Surgery	12	12.12

Table 1: *Descriptive data for demographic variables.*

Table 2 showed the percentage responses of 16 core questions of the BLS survey by respondents. Based on the duration of the participants' dental clinical experience, the maximum respondents were having less than 5 years (69.87%) of working experience, and only 9.33% were having more than 10 years of experience. Out of these, most participants (50.30%) had not attended BLS workshops in the past, 40.06% attended within the last 5 years, while 9.64% had attended BLS training for more than 5 years ago. When asked about the full form of BLS, 79.81% of respondents ticked it rightly. 33.11% of participants respondent correctly when asked about 'What they will do when somebody is not responding to you even after shaking and shouting at him?' Only 32.22% ticked to correct answer with asked, 'When you don't want to give mouth to mouth CPR, what can be done?' As for the questions on chest compression in adults, more than half of the participants (53.01%) were able to identify that the right location of the hands for chest compression is the center of the chest. Also, almost half of the participants (51.21%) identified the correct chest compression rate (100/min) while only 34.33% rightly have the knowledge for the depth of chest compression (1 - 1.5 inch) in adults during BLS. The right way to manage a choking adult patient was identified by only 13.25% of participants, while 46.98% were able to identify the correct way to manage a choking pediatric patient.

For how long have you been practicing dentistry?		
Years of practice	**No. of subjects**	**Percentage**
Less than 5 years	232	69.87
Between 5 to 10 years	69	20.78
More than 10 years	31	9.33
Have you ever attended a workshop on BLS?		
No	167	50.30
Yes, The last attended BLS workshop was more than 5 years	32	9.64
Yes, The last attended BLS workshop was within the last 5 years	133	40.06
What is the abbreviation of BLS?		
Basic life services	3	0.90
Basic life support	265	79.81
Basic lung support	5	1.51
Best life support	19	5.72

I don't know	40	12.05
If you confirm somebody is not responding to you even after shaking and shouting at him, what will be your immediate action (provided that the skin is safe)		
Activate EMS	79	23.79
I don't know	34	10.24
Observe	7	2.11
Put him in recovery position	19	5.72
Start CBR	83	25
Start CPR	110	33.11
If you don't want to give mouth to mouth CPR, the following can be done except		
Bag mask ventilation with chest compression	55	16.57
Chest compression only	40	12.04
I don't know	37	11.11
Mouth mask ventilation and chest compression	93	28.01
No CPR	107	32.22
What is the location for chest compression for adults?		
I don't know	37	11.11
Left side of the chest	24	7.22
Mid Chest	156	46.98
Right side of the chest	8	2.41
Xiphisternum	106	31.9
Chest compression	1	0.30
Rate of chest compression in adult and children during CPR		
70/min	36	10.84
80/min	27	8.13
100/min	170	51.21
120/min	42	12.65
I don't know	57	17.16
Depth of compression in adult during CPR		
½ - 1 CM	9	2.71
1 - 1½ inches	114	34.33
2½ - 3 inches	74	22.28
I don't know	67	20.18
One-half to one-third depth of chest	68	20.48
If you and your friend are having food in canteen and suddenly your friend starts expressing symptoms of choking, what will be your first response?		
Confirm foreign body aspiration by talking to him	44	13.25
Give abdominal thrusts	167	50.30
Give back blows	71	21.38

Give chest compression	14	4.21
I don't know	36	10.84
You are witnessing an infant who suddenly started choking while he was playing with a toy, you have confirmed that he is unable to cry (or) cough, what will be your first response?		
Back blows and chest compressions of five cycles each then open the mouth and remove foreign body only when its seen	156	46.98
Give water to the infant	9	2.71
I don't know	53	15.96
Start CPR immediately	30	9.03
Try to remove the suspected foreign body by blind finger swiping technique	84	25.30
Do you think that all dental students and staff need to know about BLS?		
No	22	6.62
Yes	310	93.37
Do you think BLS training should be part of your dental curriculum?		
No	27	8.13
Yes	305	91.87
Are you reluctant to perform CPR to a stranger?		
No	176	53.01
Yes	156	46.98
If you are reluctant to perform CPR, please indicate the reason for reluctance		
Fear of acquiring infection during CPR	34	10.24
Fear of causing further harm or injury to patient	91	27.41
Fear of taking responsibilities	35	10.54
Not confident	64	19.28
No response	108	32.53
Rate yourself on BLS knowledge?		
Average	137	41.27
Below average	63	18.97
Excellent	9	2.71
Good	63	18.97
Poor	60	18.08
Indicate the reason for lack of knowledge of BLS		
Busy curriculum	55	16.56
Lack of interest	43	12.95
No professional training available	134	40.36
Various combinations of above 3 factors	100	30.12

Table 2: *Distribution of subjects according to response to questions.*

The majority of the participants (93.37%) thought that General dental practitioners, dental students, and staff should know about BLS, and it should be included (98.17%) in the dental curriculum. More than half of the respondents (53.01%) were not reluctant to perform CPR on a stranger. Among those who are reluctant, 27.41% indicated that the reason for reluctance is being afraid of causing harm to the patient. More than 50% of participants rated themselves with insufficient knowledge of BLS. Concerning the reasons for lack of BLS knowledge, 30.12% of the respondents chose multiple reasons for it, including the busy curriculum, non -availability of professional training, and the lack of interest. Some participants offered other written reasons, which revolve around the belief that medical emergencies are not commonly encountered.

A high statistically significant difference was detected among the eleven academic groups (ANOVA; F= 31.3442, p = 5.02). The post hoc comparison using Tukey HSD test showed that the 4th year BDS students' mean score was significantly higher than the other ten studied academic groups regarding knowledge and attitude of Basic Life Support. A significant difference ($p < 0.05$) was noted regarding the education level and mean scores gained from the BLS survey. Moreover, there was a significant difference ($p = 0.022$) noted among the participants' total mean score obtained in the survey with more than 10 years of clinical experience compared to the less experienced ones (Table 3).

Parameters	F-statistics	p-value	df
Academic level	31.3442	5.0210e-12*	331
Education	6.1537	0.0011*	331
Year of practice	0.7221	0.0226*	331

Table 3: *Relation of parameters affecting the knowledge about BLS.*
**p-value < 0.05 is significant.*

Discussion

This survey was well received by BDS students, Interns and staff of King Khalid University dental school, as well as General dental practitioners of Abha, Saudi Arabia, as a high response rate (90.93%), is indicative of the importance of 'Basic life support (BLS)' topic to them. However, the survey results showed that they all had inadequate BLS knowledge. Our findings are in accordance with previous studies [8,9] that found similar results and concluded that BLS awareness and knowledge need to be improved and updated.

The maximum participation in the survey was from dental students compared to staff and general practitioners. This could be because students (2nd year onwards) attended dental clinical postings. They had taken mandatory BLS course training within the previous six months, while the majority of general practitioners and staff lacked in this training. Similar results were observed by Cooper., *et al*. [10] who found a significant improvement in the knowledge and skills of the participants who had taken a BLS course within the previous six months. In the present study, the females had more participation than males indicating their more self-confidence and practical skills.

Most of the participants thought that dentists and dental students should know about BLS and that it should be included in the dental curriculum. Similarly, the studies by Pillow., *et al*. [11] and Roshana *et al*. [12] found that 98.2% and 95% of students respectively believed that BLS should be included in the medical undergraduate student curriculum. In the present study, 68.87% of the subjects had less than 5 years of clinical practice, while 9.33% had more than 10 years of experience. This showed that a decline in knowledge on BLS over time. Sudeep., *et al*. [13] demonstrated that training improved the knowledge and skills of CPR. Also, Jensen., *et al*. [14] showed that at least half a year of clinical experience was important before participating in a BLS course to improve the retention of learning.

In this study, one question (related to the abbreviation of BLS) was correctly answered by 79.81% of the participants. Similar results were seen by Roshana., *et al*. in their study [12]. In the present study, 46.9% of participants were reluctant to perform resuscitation. A

study by Laurent., *et al*. [15] found that final-year dental students expressed themselves as skilled at performing CPR; however, they could not competently manage a cardiac arrest. In the present study, the most common cause of reluctance was the fear of further harm to the victim, followed by the fear of being ineffective and the fear of taking responsibilities. Roshana *et al*. [12] found that the most commonly cited anxiety for resuscitation performance was the fear of being ineffective, followed by the fear of further harm to the victim. In addition to insufficient knowledge and lack of training, these fears explain why most of the participants were reluctant to perform CPR.

Almost two-thirds of the participants were able to correctly identify the location (46.9%), rate of chest compressions (51.21%) required in children and adults, and depth of chest compression in adults (34.33%). This was corroborated by the findings of a study conducted in South India [16] and Karnataka [17].

More than 50% of the participants rated them inadequate for BLS. There can be several causes behind the disappointing figures from our survey. Nonetheless, factors which restrict the dental health care professionals from receiving regular BLS training are compelling. Hectic residency schedules and scarcity of resources act as a significant barrier. Lack of passion for learning resuscitation during internship and residency training, a limited number of BLS programs being offered, lack of assessment tools following a training course, decreased encounter with relevant patients, and difficulty retaining knowledge. As compared to the inadequate slots in training programs, an increasing number of dentists are only a few limitations to adequate knowledge of BLS. A study demonstrated that cardiopulmonary arrest could occur in some emergency dental practice cases if they are not appropriately managed [18]. Starc., *et al*. [19] demonstrated how first-year medical students had satisfactory BLS skills when assessed shortly after a course, thereby allowing the deduction that the more recent the training, the greater the skillfulness. This calls for refresher training courses in addition to the mandatory BLS course taken once around graduation to allow for persistent expertise in the skill.

The study's main limitations included practical skills that could not be assessed in the present study; however, it focused only on BLS's cognitive levels. Secondly, the study was conducted at a single Dental college; therefore, generalizing the results is not plausible. Thirdly, a questionnaire-based study and the skill set, and improvising capabilities of the individuals added to their intellect could not be measured. Finally, the study included only the participants who completed the whole questionnaire in the final analysis. Any incomplete forms were discarded. This technique is likely to produce non-reporting bias, which needed to be assessed.

Conclusion

The study demonstrated that dental students, King Khalid University Dental College staff, and General dental practitioner of Abha, Saudi Arabia, had inadequate knowledge and attitude towards BLS. Approximately only one-third of participants were confident in saving a life with their current ALS knowledge. Nearly all participants thought that BLS teaching and training should be incorporated in the dental curriculum and should be frequently and regularly revised, testing knowledge and skills at regular intervals.

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