

The Effect of Basic Life Support Workshop on Performance Skills of Iranian Undergraduate Dental Students

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Background: Considering the occurrence of medical emergencies in dental practice, and the essential need of acquiring competency in Basic life support (BLS), the aim of the present study was to evaluate the effect of BLS workshop on the skills of dental students in the cardiopulmonary resuscitation.

Methods: In this switching replication experimental study, students in the 5-year of Mashhad dental school (Iran) in 2013 participated in the study. All participants completed a baseline assessment at the skill lab (pre-test). To evaluate the practical skills of students in the cardiopulmonary resuscitation, a scenario was presented, and the students were asked to demonstrate all the actions that are necessary to rescue the patient on a manikin. A trained instructor scored their skills according to a standard checklist. Then; the participants were randomly divided into two groups. The first group took BLS workshop and was assessed immediately after the workshop (immediate post-test), while final examination was conducted one month after the course. The same scenario was used for all participants at each testing point. In the second group, the second pretest was taken within one month of the first pretest. Immediately after taking the second pretest, the students participated in workshop, and were assessed immediately after the course. To compare the score of competency in BLS in the two groups, t-test or Mann-Whitney U-test was used.

Results: Primary skills of the two groups were almost similar ($P=0.77$). Considerable increase in the skills of two groups was observed after taking the workshop. One month interval between the two pretests in the second group did not cause any significant difference in the students' skills ($P=0.12$). A decrease was observed in the skills of first group one month after the first exam ($P=0.003$).

Conclusions: BLS workshops can significantly increase dental students' competency in life support. However, considering the retention time of skills, refreshing courses are strictly recommended.

Keywords: Cardiopulmonary Resuscitation, Education, Skills, Students

تأثیر برگزاری کارگاه آموزشی "احیاء قلبی ریوی پایه" بر سطح مهارت دانشجویان دندانپزشکی در ارائه اقدامات لازم برای احیاء قلبی و ریوی پایه

مقدمه: با توجه به وقوع اورژانسهای پزشکی در حین اعمال دندانپزشکی و نیاز اساسی به کسب مهارت در احیاء قلبی و ریوی پایه، هدف از انجام این مطالعه تعیین اثر برگزاری کارگاه آموزشی "احیاء قلبی ریوی پایه" بر سطح مهارت دانشجویان دندانپزشکی در ارائه اقدامات لازم برای احیاء قلبی و ریوی پایه بود.

مواد و روشها: در این مطالعه که به روش موسوم به "سوئیچینگ رپلیکیشن" انجام شد، دانشجویان سال پنجم دانشکده دندانپزشکی مشهد (ایران) در سال ۱۳۹۲ مورد بررسی قرار گرفتند. مهارتهای پایه تمام دانشجویان در محل skill lab تا زمان تست مورد سنجش قرار گرفت. برای ارزیابی مهارتهای عملی دانشجویان در احیاء قلبی ریوی، یک سناریو طرح ریزی و در اختیار آنان قرار گرفت و از دانشجویان خواسته شد تمام اقدامات عملی که برای نجات بیمار ضروری است را بر روی مانکن انجام دهند. یک آزمونگر نیز مهارتهای آنان را بر اساس چک لیست استاندارد نمره گذاری کرد. سپس شرکت کنندگان به صورت تصادفی به دو گروه تقسیم شدند. بدین ترتیب که در گروه اول یک دوره آموزش عملی و نظری احیاء قلبی ریوی پایه برگزار شد و بلافاصله پس از آن مورد ارزشیابی قرار گرفتند (تست بلافاصله). این گروه پس از یک ماه از زمان آخرین ارزشیابی مجدداً مورد ارزشیابی نهایی قرار گرفتند. در تمام ارزیابیها از سناریوی مشابه استفاده شد. در گروه دوم، دو پرده تست با فاصله یک ماه برگزار شد و سپس یک دوره آموزش عملی و نظری احیاء قلبی ریوی پایه برای ایشان ارائه گردید و بلافاصله مورد ارزشیابی نهایی قرار گرفتند. برای مقایسه میزان صلاحیت در انجام احیاء قلبی ریوی در دو گروه از آزمونهاى آماری تی تست و من ویتنی استفاده شد.

یافته ها: نتایج حاکی از این بود که مهارت اولیه دانشجویان دو گروه تقریباً مشابه هم بود و تفاوت معنی داری نشان ندادند ($P=0.77$). همچنین در هر دو گروه مهارت دانشجویان بعد از برگزاری کارگاه تفاوت قابل توجه و معناداری را نشان داد. فاصله یک ماهه پس از دو پرده تست گروه دوم تفاوتی را در مهارت دانشجویان سبب نشد ($P=0.12$). همچنین مهارت دانشجویان گروه اول پس از یک ماه از زمان برگزاری کارگاه کاهش معنی داری را نشان داد. ($P=0.003$).

نتیجه گیری: برگزاری کارگاه مهارتهای احیاء قلبی ریوی پایه می تواند به طور معناداری مهارت دانشجویان را در انجام احیاء قلبی ریوی افزایش دهد. با اینحال با توجه به مدت زمان ماندگاری این مهارت، برگزاری مجدد کارگاه جهت به روز کردن این مهارتها اکیداً توصیه می شود.

واژه های کلیدی: احیاء قلبی ریوی - آموزش - مهارت دانشجویان

مستوی تأثیر اجرا عمل تعلیمی فی مجال احیاء القلب و الرئه الاولی علی مستوی مهاره طلاب طب الأسنان فی تقدیرم خدمه الاحیاء القلبی و الرئه الاولی

المقدمه: نظراً الى حصول امور طارئة طبياً أثناء عمليات طب الأسنان و وجود حاجة ملحة لإكتساب المهاره الاولیة فی احیاء القلب و الرئه تمت هذه الدراره برصد تعیین مستوی اثر اجراء عمل تعلیمی "احیاء القلبی و الرئی الاولی" علی مستوی المهاره عند طلاب طب الأسنان فی مجال الإقدامات اللازمة علی صعید الاحیاء القلبی و الرئی.

الطریقه: فی هذه الدراره الذی تمت علی اسلوب (سوئیچینگ رپلیکشن) تم الاختیار علی طلاب السنه الخامسه فی کلیه طب الأسنان فی مشهد (ایران) فی عام 1392. تم تقییم المهارات الاولیة للطلاب عبر فقص اولی فی المختبر التعلیمی و تم تحضير سناریو يتم اجراءه من قبل طلاب علی مجسات عبر استمارات تم تحضيرها لهذا امر. و بعد ذلك تم تقسیم المشترکین الی فریقین و تم اجراء دوره عملیه و نظریة للإحیاء الاولی للقلب. و الرئه للفریق الاول و بعد ذلك تم تقییمه مباشره و تم اجراء الاختیار النهایة بعد شهر. و اما الفریق الآخر اولثانی تم أخذ اختبایرین أولین بفاصله زینة و هی شهر و بعد ذلك تم اجراء دورة تعلیمیة عملیه و نظریة للإحیاء الاولی للقلب و الرئه و بعد ذلك تم اجراء اختبایر نهایة مباشره. تم استخدام المعایر الإحصائیة T test (و من ویتنی)

النتائج: أشارت النتائج إلی أن المهاره الاولیة عند الفریقین كانت متشابهه و لم یکن هناك إختلاف ذوقیة $p=0.77$ و أيضاً اشارت النتائج إلی أن هناك تفاوت بین الفریقین علی مستوی المهاره بعد اجراء العمل التعلیمی.

لم یکن هناك تأثیر لفاصله الزینة الشهر بعد الاختبایرین الأولین فی الفریق الثانی علی مستوی المهاره عند الفریق الاول بعد شهر من اجراء العمل التعلیمی ($p=0.003$)

الاستنتاج: اجراء العمل التعلیمی للمهاره الاولیة فی احیاء القلب و الرئه یساعد بشكل واضح فی رفع مستوی مهاره الطلاب فی مجال الاحیاء القلبی و الرئی. و نظراً إلی المدة القصیره لبقاء هذه المهاره ننصح بتجديد هذه المعامل العلمیة.

الكلمات الرئيسية: الاحیاء القلبی و الرئی - تعلیم - مهاره الطلاب .

ڈینٹل اسٹوڈنٹس کے سی پی آر ٹریننگ کی افادیت

بیگ گراؤنڈ: ڈینٹل آپریشن اور کاموں کے دوران کبھی کبھی میڈیکل ایمرجنسی پیش آجاتی ہے جس سے نمٹنے کے لئے ڈینٹل طلباء کو سی پی آر کی ٹریننگ دینا ضروری ہے۔

روش: اس تحقیق میں جسے سوئیچنگ رپلیکیشن کہا جاتا ہے مشہد یونیورسٹی آف میڈیکل سائنس کے پانچویں سال کے میڈیکل طلباء نے شرکت کی۔ ایک پری ٹسٹ کے ذریعے طلباء کی مہارتوں کا جائزہ لیا گیا۔ سی پی آر کی مہارتوں کا جائزہ لینے کے لئے طلباء سے ایک بے جان ماڈل پر سی پی آر انجام دینے کو کہا گیا۔ ایک ممتحن نے چیک لیست کے مطابق ان کو نمبر دئے۔ اسکے بعد طلباء کو ریٹڈ طریقے سے دو گروپوں میں تقسیم کر دیا گیا اور ان سے دو پری ٹسٹ لے گئے۔ اس کے بعد ایک ماہ بعد بھی دونوں گروپوں سے سی پی آر کا ٹسٹ لیا گیا اس کے بعد ان کے لئے سی پی آر کی ٹریننگ رکھی گئی۔ دونوں گروپوں کی صلاحیتوں کی جانچ کرنے کے لئے ٹی ٹسٹ اور مین ویٹنی سے استفادہ کیا گیا۔

نتیجے: اس تحقیق سے یہ پتہ چلتا ہے کہ ٹریننگ سے پہلے دونوں گروپوں کی توانائیاں تقریباً ایک جیسی تھیں لیکن جب انہیں سی پی آر کی ٹریننگ دی گئی تو ظاہر سی بات ہے کہ ان کی صلاحیتوں میں اضافہ ہوا۔

سفارش: سی پی آر ٹریننگ ڈینٹل طلباء کی صلاحیتوں میں نکھار لانے کا سبب بنتی ہے لہذا ان طلباء کو یہ ٹریننگ دینا چاہیے اور وقفے وقفے سے اس ٹریننگ کو دہرانا چاہیے۔

کلیدی الفاظ: سی پی آر، مہارت، ورک شاپ۔

INTRODUCTION

Competence in performing Basic life support (BLS) or advanced cardiac life support (ACLS) is essential in all medical professions (1). Emergency event during dental procedures were reported on average for every 4.5 practice years in England (2). Resuscitation training is an increasingly popular concern in undergraduate medical education curricula. However, given the high cost of simulation-based courses, one of the most important considerations is the effectiveness of these trainings (3).

Learning theories indicate that learning from simulation-based training may rapidly degrade over time (1, 4). This is confirmed by several studies on the competence in cardiopulmonary resuscitation of health professionals (5-7). Most of these studies have demonstrated that the acquired ALS competence suffer from significant decay over time. It is therefore vital to identify strategies that improve the retention of learning from resuscitation courses. Ringsted et al (8) reported that retention of knowledge and skills is probably dependent on the level of primary learning outcome, and that some degree of over-learning might prolong the retention of adequate life support competence. Broadbent and Thomson (9) reported that more than half of the general dental practitioners in New Zealand were dissatisfied with the training they had received for medical emergencies as undergraduate students. On the other hand, 20% of general dentists in Great Britain felt inadequately prepared for management of medical emergencies (10). Similarly, in a previous survey in Brazil, most of the dentistry students were not satisfied with the training they had received on medical emergencies (11).

In Iran, a recent study showed that only 37% of dentists acquired enough knowledge and experience about cardiopulmonary resuscitation (CPR). Although 70% had gained relative information about CPR, most of them had not been trained in practical-simulated conditions (12).

The aim of the present study was to evaluate the effect of BLS workshop on the clinical skills of dental students in the cardiopulmonary resuscitation.

METHODS

This prospective, repeated – measure, switching replication experimental designed study was conducted at the dental school of Mashhad University of Medical Sciences (Iran) in 2013, and was approved by the regional ethical committee. Undergraduate students in the 5th year of dental school participated in the study. Uncooperative students who did not have the tendency to participate in the workshop, and also those who had already passed the workshop were excluded from the study. Participants were informed about the aim and scope of the study and signed a written informed consent.

Before taking the training BLS workshop, all participants completed the baseline assessment at the skill lab (pre-test). To evaluate and score the practical skills of students in the cardiopulmonary resuscitation, the following scenario was presented to students. They were asked to demonstrate exactly and in the order, all the actions that are necessary to rescue the patient on a manikin.

Presented scenario: You are going to visit your patients at

the hospital ward in the morning. Suddenly, you see an averaged-old man falling down on the ground. No one except you is available at the place. You run into him for help. What would you do to rescue the patients?"

An instructor watched and scored the performance skills of students according to a checklist. To increase the validity of the assessments, AHA evaluation checklist was used and the instructor was certified in ACLS and BLS with experience in practice, teaching and evaluating performance. The instructor was not allowed to talk to participants and only observed and scored their skills according to standard checklist. Evaluated skills were as follows: recognition of need for resuscitation, establishing unresponsiveness, Automated External Defibrillator (AED), opening the airway by manual maneuvers, establishing lack of breath, rescue breathing, establishing lack of pulse, cardiac compressions. The participants were randomly divided into two groups. The first group took BLS workshop. Total average time for training was 3 hours including one hour of theoretical training and 2 hours of practical training on standard manikin. Adequacy of compressions and ventilations was assessed using a skills recorder.

The first group was assessed immediately after taking the workshop (Immediate post-test), and final examination was conducted one month after the course (second post-test). The same scenario was used for all participants at each testing point. In the second group, the second pretest was taken within one month of the first pretest. Immediately after taking the second pretest, the students participated in the BLS workshop. This group was assessed for the third time, immediately after the course. The design and flow of participants are summarized in Diagram 1.

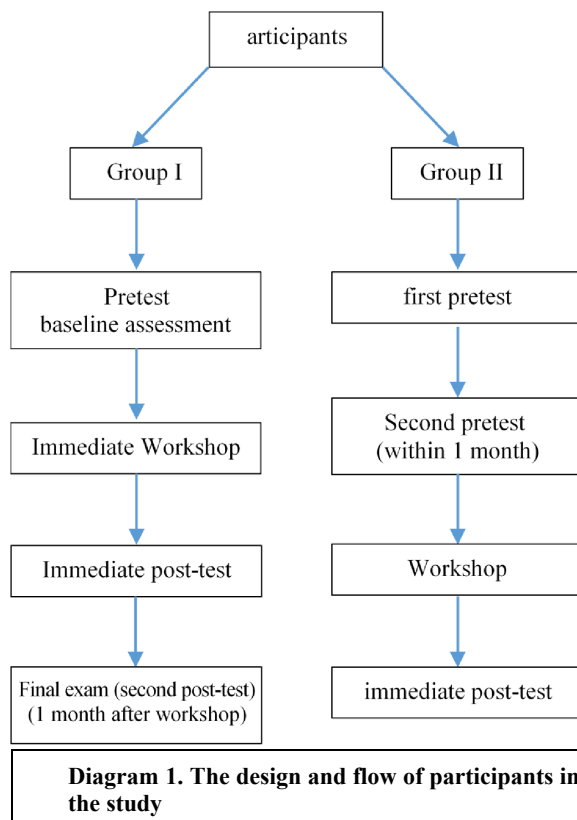


Table 1. Mean score of the BLS – competence of students in both groups at each measurement

Group	Mean ± SD	P - value
Baseline assessment in the first group	7.22 ± 2.70	0.77
Baseline assessment in the second group	6.97 ± 3.41	
First pretest	6.96 ± 3.40	0.12
Second pretest in the second group	7.40 ± 3.75	
Pretest	7.21 ± 2.69	P < 0.0001
Immediate post-test in the first group	20.69 ± 2.67	
First pretest	6.96 ± 3.40	P < 0.0001
Immediate post-test in the second group	20.40 ± 2.01	
Second pretest	7.40 ± 3.57	P < 0.000
Immediate post-test in the second group	20.40 ± 2.01	
Immediate post-test in the first group	20.69 ± 2.67	0.09
Immediate post-test in the second group	20.14 ± 2.01	
Immediate post-test	20.69 ± 2.67	0.003
Final exam in the first group	18.65 ± 2.42	

To compare the score of two groups at each measurement, t-test or Mann-Whitney U-test was used. P < 0.05 was set as significant.

RESULTS

53 fifth year dental students participated in this study. There were 23 and 30 participants in the first and second group, respectively. Subjects were in the age range of 24-25 years old. 60% of participants were female.

Baseline assessment did not show a significant difference between the two groups (P = 0.77). Also comparison between the first and second pretest in group two did not reveal a significant difference in students' BLS skills (P = 0.12). However, mean score of the first group in the post test (immediately after taking the course) was significantly higher than their pretest score (P < 0.0001). Similarly, there was a significant difference between the mean scores of the first and also the second pretest and final exam in the second group (P < 0.0001).

Mean score of the two groups immediately after taking the course did not show a significant difference (P = 0.09). On the other hand, mean score of the first group one month after the workshop considerably decreased compared to their gained score immediately after the course (P = 0.003).

The result of the mean scores of the students in both groups at each measurement is shown in Table 1.

DISCUSSION

Switching replication is considered as a reliable method in experimental studies (13). Educational programs are successful and motivating provided that they cover the real needs of attendees (14, 15). In present study, the effect of pretest itself on basic skills of students was evaluated. Also, retention of the students' competence in BLS was investigated one month after taking the workshop.

Comparison of the mean score of the first and second

pretest did not show a significant difference in the second group. This indicates that the pretest itself did not motivate students to improve their abilities in resuscitation. On the other hand, although taking pretest and post-test, the retention of BLS skills in students decayed significantly over time. This finding is in contrast to the results of Komelasky and Bond (16), who reported that pretest / post-test can be a good learning reinforcement upon retention of CPR skills.

Webb et al (17) reported that mere theoretical training increased BLS competency in only 22% of medical professionals. The students in present study had passed some theoretical training in the fourth year of their education. However, their basic skill in BLS was considerably low. This result highlights the importance of receiving practical hands-on training.

We found a significant decay in students' competence within one month after the course. This result is consistent with most of the previous literature on retention times of skills in BLS (1, 18, and 19). This emphasizes the importance of frequent BLS refreshing course and allowing more time for hands-on skill practice for health care professionals to reduce the potential risk of death and disability secondary to delay in resuscitation. On the other hand, it has been shown that strategically placed CPR wall posters markedly improve retention of both resuscitation knowledge and practical skills (20).

Role expectation and responsibility demand that dentists provide competent and safe resuscitation. Unfortunately, there is not a required demand for CPR certification when graduating from dental school in Iran. Actually, BLS skills are mainly thought theoretically as part of the surgery course, which shows a strong demand for revision in dental curriculum.

According to Jensen et al (21) the overall average grade of a student is a significant contributor to BLS-competence. This reflects that the generally good students do well in this area

as they do in other fields. Unfortunately, we didn't have any information regarding the average grade of participants in our study.

Further research of educational methods for resuscitation training is needed.

BLS workshops can significantly increase dental students' competency in life support. However, considering rapid decay of practical skills over time, refreshing hands-on courses are strictly recommended. Merely taking pretest exams did not improve students' competency in BLS.

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Conflict of Interest: The authors declare that they have no conflict of interests.

REFERENCES

- 1-Smith KK, Gilcreast D, Pierce K. Evaluation of staff's retention of ACLS and BLS skills. *Resuscitation* 2008; 78(1):59-65.
2. 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(2):72-9.
3. Jensen ML, Lippert F, Hesselheldt R, Rasmussen MB, et al. The significance of clinical experience on learning outcome from resuscitation training-a randomised controlled study. *Resuscitation* 2009 ;80(2):238-43.
4. Patrick J. Training design: introduction and theories. Training: research and practice. Academic Press; 1992.
5. Cooper S, Johnston E, Priscott D. Immediate life support (ILS) training Impact in a primary care setting? *Resuscitation* 2007; 72(1):92-9.
6. Boonmak P, Boonmak S, Srichaipanha S, Poomsawat S. Knowledge and skill after brief ACLS training. *J Med Assoc Thai* 2004 ; 87(11):1311-4.
7. Su E, Schmidt TA, Mann NC, Zechnich AD. A randomized controlled trial to assess decay in acquired knowledge among paramedics completing a pediatric resuscitation course. *Acad Emerg Med* 2000 ; 7(7):779-86.
8. Ringsted C, Lippert F, Hesselheldt R, Rasmussen MB, et al. Assessment of Advanced Life Support competence when combining different test methods--reliability and validity. *Resuscitation* 2007 ; 75(1):153-60.
9. Broadbent JM, Thomson WM. The readiness of New Zealand general dental practitioners for medical emergencies. *N Z Dent J* 2001; 97(429):82-6.
10. Atherton GJ, McCaul JA, Williams SA. Medical emergencies in general dental practice in Great Britain. Part 2: drugs and equipment possessed by GPs and used in the management of emergencies. *Br Dent J* 1999; 186(3):125-30.
11. Arsati F, Montalli VA, Flório FM, Ramacciato JC, et al. Brazilian dentists' attitudes about medical emergencies during dental treatment. *J Dent Educ* 2010; 74(6):661-6.
12. Kavari SH, Chohedri AH. Cardiopulmonary resuscitation: knowledge and personal experience in Iranian dentists. *Pak J Med Sci* 2007; 23(2):296-297.
13. Trochim W. The research methods knowledge base.2. Thomson learning. 2007:363.
14. Zahed moghaddam HA, Labbaf Ghasemi R, Ghouskhaneh H, Afshari R, Marouzi P. Knowledge of social accountability in medical education among faculty members at Medical Sciences of Mashhad University. *FMEJ* 2013;3(3):20-3.
15. Borouziyat A, Shahriari M, Akbari M. Educational needs assessment of Mashhad dentists about principles of bonding and adhesives in dentistry. *FMEJ* 2013; 3(4): 10-4.
16. Komelasky AL, Bond BS. The effect of two forms of learning reinforcement upon parental retention of CPR skills. *Pediatr Nurs* 1993; 19(1):96-8, 77.
17. Webb DD, Lambrew CT. Evaluation of physician skills in cardiopulmonary resuscitation. *JACEP* 1978 ;7(11):387-9.
18. Nyman J, Sihvonen M. Cardiopulmonary resuscitation skills in nurses and nursing students. *Resuscitation* 2000; 47(2):179-84.
19. Devlin M. An evaluative study of the basic life support skills of nurses in an independent hospital. *J Clin Nurs* 1999; 8(2):201-5.
20. Chapman PJ. Medical emergencies in dental practice and choice of emergency drugs and equipment: a survey of Australian dentists. *Aust Dent J* 1997; 42(2):103-8.
21. Jensen ML, Hesselheldt R, Rasmussen MB, Mogensen SS, et al. Newly graduated doctors' competence in managing cardiopulmonary arrests assessed using a standardized Advanced Life Support (ALS) assessment. *Resuscitation* 2008; 77(1):63-8.