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EFFECTS OF SIMULATION - BASED EDUATION APPROACH IN BETTERMENT OF ADVANCED CARDIOVASCULAR LIFE SUPPORT SKILLS AMONG MEDICAL STUDENTS

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Abstract:

Objective: *In this paper, we aimed to evaluate the effect of a simulation-based educational approach on advanced cardiovascular life support skills among advanced medical students.*

Study Design: *Convenient sampling method.*

Place and Duration: *In the emergency department of Services Hospital Lahore for six months duration from July 2018 to December 2018.*

Methods: *40 trainees participated in the study with a suitable sampling method. Pre- and post-test examinations included advanced cardiovascular life support workshops (ACLS). The workshops and checklists for the pre-test and post-test were designed according to the latest guidelines of the American Heart Association (AHA).*

Results: *The total scores of the students increased significantly after the workshops (100.6 to 100.6). This shows a 53.9% improvement in skills after simulation-based training (P <0.001). There was also a significant improvement in the mean score of each station (P <0.001).*

Conclusion: *Preliminary tests showed that internees performances on practical clinical issues were low, and scientific knowledge such as ECG interpretations was acceptable. The overall results of the study emphasize that the simulation-based education approach is very effective in developing ACLS skills among medical students.*

Key words: *Cardiopulmonary resuscitation (CPR), Advanced cardiovascular life support (ACLS), Human patient simulation (SPH), Internee, Simulation based training.*

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INTRODUCTION:

Cardiopulmonary resuscitation (CPR), a part of the Advanced Cardiovascular Life Support (ACLS), is a procedure for protecting brain functions from spontaneous blood circulation to respiratory arrest in cardiac arrest patients[1-3]. These emergency interventions include airway management, breathing, bradyarrhythmia and tachyarrhythmia treatment. In fact, the patient requires recovery from complex emergency situations, cardiovascular, respiratory and other metabolic, toxicological and other simple pair of hands and basic skills[4]. Obviously, the training levels of staff participating in the operation affect the quality and the outcome of cardiopulmonary resuscitation[5]. Simulation technology is one of the recommended training methods that can increase the learning process and provide a safe and controlled environment for implementation[6]. In this method, students practice in a human simulator to eliminate the possibility of endangering real patients[7]. This method offers more opportunities for observations and corrections, eliminates students' fear of operation and strengthens their self-confidence in real-life situations[8]. In this paper, we aimed to evaluate the effect of simulation-based educational approach on ACLS skills among medical students.

MATERIALS AND METHODS:

This Convenient sampling study was held in the emergency department of Services Hospital Lahore for six months duration from July 2018 to December 2018. 40 interns participated in this study for six months. These trainees vary according to their sex and the time elapsed since the beginning of their internship. The participants did not know the purpose and the classes of the exam and a blind study was adopted. ACLS workshops were conducted with pre-test and post-test. The workshops were designed for 10 hours in accordance with the ACLS training objectives, in accordance with the latest guidelines from the American Heart Association (AHA). In addition, after the end of each item, lessons and slide lessons were given, and the participants also worked on mega-code fools. The training manikin was like a real meeting with the patients, and the residents could monitor the students 'activities accurately to identify and solve the students' problems. The pre-test included 10 stations of the Structured Objective Clinical Examination (OSCE), which students had to pass before the workshop. Later, they joined the workshops and returned to the OSCE stations 2 weeks later. Checklists for each station are designed in accordance with AHA rules. The scores of each station were expressed as percentages (100 means that one person performed all steps correctly). Finally, after completing the workshop together with the next exam, the clergy completed the need for satisfaction, self-confidence and more education. The survey was based on the Likert scale. SPSS 17.0 (SPSS Inc Chicago, Illinois, USA) software was used for all statistical analyzes. Standard descriptive statistics were applied to define the model of the data. Gender, score taken before the internship (200) as an indicator of the reference information, the time from the beginning of the internship and the approval cardiology and internal courses were associated with pre-school performance. The analysis was performed using paired T test and Spearman correlation test. All tests were 2-tailed and the probability values equal to 0.05 were considered significant.

RESULTS:

40 interns participated in the study. 58% of the participants were female and 42% were male. The time elapsed from the beginning of the applications was more than 9 months in 50% of the participants. The mean score of pre-training (200) was 120.816 and 136.8 ± 10.48 as an indication of the reference information. In the preliminary examination, the maximum score was attributed to the ECG station (68 ± 15.7) and the minimum score was for the approach of the complex tachycardia station (9.54 ± 16).

Table 1. Total scores of OSCE stations

	Minimum	Maximum	Mean	Std. Deviation
Pre-education function	9	48	24.67	9.415
Post-education function	57	96	78.60	10.175

Table 1 shows the total scores of OSCE stations. The total score of the students showed that after the workshops (24.6 100 to 100.6 to 100.6) they showed a 53.9% improvement in their post-simulation skills (P <0.001) (Table 2).

Table 2. Pre- and post-education function in OSCE stations

	Pre-education function (mean ± SD)	Post-education function (mean ± SD)	Paired difference (mean ± SD)	t	P-value
Initial approach	28.9 ± 18.178	81 ± 15.317	-52.100 ± 16.246	-20.282	<0.001
ECG	68 ± 15.722	79.6 ± 9.038	-11.600 ± 10.389	-7.062	<0.001
Bradycardia	19.22 ± 9.164	75.3 ± 17.806	-56.075 ± 16.379	-21.653	<0.001
Asystole	19.55 ± 13.407	80.05 ± 12.73	-60.500 ± 13.678	-27.975	<0.001
VF/VT[1]	28.38 ± 20.851	80.92 ± 14.177	-52.550 ± 16.193	-20.525	<0.001
Unstable tachycardia	14.65 ± 13.026	76.28 ± 13.517	-61.625 ± 17.387	-22.417	<0.001
Stable_NCT[2]	14.25 ± 13.759	70.15 ± 18.516	-55.900 ± 16.100	-21.959	<0.001
Stable_WCT[3]	8.82 ± 15.584	70.7 ± 13.727	-61.875 ± 17.581	-22.259	<0.001
Electroshock	17.35 ± 17.237	82.7 ± 9.208	-65.350 ± 12.899	-32.042	<0.001
CPR	27.95 ± 16.142	89.78 ± 9.062	-61.825 ± 14.370	-27.210	<0.001

[1]Ventricular tachycardia/Ventricular fibrillation
[2]Stable narrow complex tachycardia
[3]Stable wide complex tachycardia

On the other hand, the score of each station increased significantly after the intervention (P <0.001). The highest effect of simulation-based education was the asystole station (t = -27.975) and the lowest recovery was in the ECG station (t = -7.062).

Table 3. Spearman's correlation of pre- and post-education function with possible related items

		Pre-education function	Post-education function
Gender	Correlation Coefficient	0.290	0.308
	P-value	0.070	0.054
Pre-internship score	Correlation Coefficient	0.241	0.127
	P-value	0.134	0.435
Duration from the start of internship	Correlation Coefficient	0.092	0.086
	P-value	0.574	0.600
Merely cardiology rotation	Correlation Coefficient	0.154	-0.206
	P-value	0.342	0.203
Merely internal rotation	Correlation Coefficient	0.004	-0.159
	P-value	0.982	0.326
Both cardiology and internal rotation	Correlation Coefficient	0.363*	0.409**
	P-value	0.021	0.009

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

Table 3 shows the relationship between the pre- and post-training function with the possible related items. The female gender, the highest score before the internship and the longest internship period showed weak correlation before and after the training function, but none were statistically significant (P> 0.05). Post-intervention performance developed only minimally among those who approved an internal or cardiology course, but was not statistically significant (P> 0.05); however, better performance was significantly associated with both internal and cardiology courses (P = 0.009).

Table 4. Pre- and post-education function according to passing internal and cardiology rotation

	Pre-education function (mean ± SD)	Post-education function (mean ± SD)
Neither	16.4 ± 4.648	74.4 ± 10.058
Cardiology	26.43 ± 5.996	73.43 ± 11.574
Internal	24.25 ± 8.382	75.5 ± 4.041
Both	28.47 ± 10.151	83.37 ± 8.946
Total	24.67 ± 9.415	78.6 ± 10.175

In addition, pre-school function was strongly correlated with post-training performance with a correlation coefficient of 0.662 (Table 4). Table 5 shows the personal report on the demand for satisfaction, self-confidence and more training after participating in workshops on a five-stage Likert scale.

Table 5. Satisfaction, self-esteem and demand for more training after participation in workshops (scores out of 5)

	Mean	SD
Simulation-based education strengthens my clinical skills	4.2	1.1
I received very useful feedback from Simulation-based education	4.6	0.9
Simulation-based training enhances my confidence	4.6	1.2
Simulation-based training is more valuable than bedside teaching	2.8	1.3
Simulation-based training should be an essential part of educational curriculum	4.3	1.2

DISCUSSION:

Cardiopulmonary insufficiency is the most dangerous situation for human beings and is the most critical condition for the physician. The doctor should receive adequate training to make the best decisions and react as quickly as possible to save the patient's life[9]. These skills can only be achieved by a good education method. Different results indicate that hospitals with experienced and trained teams have higher success rates in CPR and patients[10]. In this paper, the effect of simulation-based educational approach on ACLS skills among medical students was evaluated[11]. This study showed that before the intervention, the judiciary was able to perform poorly in practical clinical subjects, while the scientific knowledge was acceptable as an interpretation of the ECG. Studies at the University of Chicago show that animation quality is different when used by experienced staff who do not read any published guidelines[12]. In addition; Most of the inhabitants have little or no experience in dealing with different situations during the ACLS during the first year of residence. Although 75% of interns received internal and cardiology courses, their academic knowledge and practices in management of patients with cardiopulmonary arrest and other ACLS conditions were inadequate[13]. This may be due to the lack of active training and active participation in resuscitation and clinical training during internal rotations and cardiology[14]. The overall results of the study and the statistical analysis of the data showed that the simulation-based education approach was highly effective in developing ACLS skills among medical students. In a study conducted by the University of Tehran Medical Sciences in Imam Khomeini Hospital, the success rate of operations performed by experienced staff increased from 18.4% to 30%. A better performance after our study was significantly related to the validation of an internal and cardiology course in this study[15]. This suggests that basic knowledge and experience can increase the educational process. Other studies have shown that the use of trained staff experienced in re-start operations significantly improves recovery. This study has some limitations. The ACLS workshops were held in the morning, and some interns spent the night shifts after hours of emergency care. Therefore, practitioners in these classes felt present and tired and numb, and performance degradation had an impact. This study showed that ACLS training was accompanied by simulation and by a large increase in student learning with model mega code. It is therefore recommended that such education should be taken into consideration in the learning curricula

of medical students.

CONCLUSION:

This study showed that ACLS is accompanied by a large increase in student learning through simulation. Also; Interns were interested in the process, welcomed and satisfied. Therefore; The implementation of this method may be recommended in all areas of medical education. This type of education should pay particular attention to the learning skills and curricula of medical students and even different groups.

REFERENCES:

1. Powers, Summer, Nancy Claus, Allison R. Jones, Michael R. Lovelace, Kendra Weaver, and Penni Watts. "Improving Transition to Practice: Integration of Advanced Cardiac Life Support Into a Baccalaureate Nursing Program." *Journal of Nursing Education* 58, no. 3 (2019): 182-184.
2. Lau, Ying, Daniel Guang Hui Chee, Zulkarnain Bin Ab Hamid, Benjamin Sieu-Hon Leong, and Siew Tiang Lau. "Interprofessional Simulation–Based Advanced Cardiac Life Support Training: Video-Based Observational Study." *Clinical Simulation in Nursing* (2019).
3. Veloso, Sérgio Geraldo, Gabriel Santos Pereira, Nathália Nascimento Vasconcelos, Maria Helena Senger, and Rosa Malena Delbone de Faria. "Learning by teaching basic life support: a non-randomized controlled trial with medical students." *BMC medical education* 19, no. 1 (2019): 67.
4. McCoy, C. Eric, Asif Rahman, Juan C. Rendon, Craig L. Anderson, Mark I. Langdorf, Shahram Lotfipour, and Bharath Chakravarthy. "Randomized Controlled Trial of Simulation vs. Standard Training for Teaching Medical Students High-quality Cardiopulmonary Resuscitation." *The western journal of emergency medicine* 20, no. 1 (2019): 15-22.
5. Smith, Michael William, and David Abarca Rondero. "Predicting electrocardiogram interpretation performance in Advanced Cardiovascular Life Support simulation: comparing knowledge tests and simulation performance among Mexican medical students." *PeerJ* 7 (2019): e6632.
6. Jones, Ian, Julie Ann Hayes, Janet Williams, and Hannah Lonsdale. "Does electronic decision support influence advanced life support in simulated cardiac arrest?." *British Journal of Cardiac Nursing* 14, no. 2 (2019): 72-79.
7. Lehmann, Ronny, Thomas Lutz, Astrid Helling-Bakki, Sebastian Kummer, Sören Huwendiek, and Hans Martin Bosse. "Animation and interactivity facilitate acquisition of pediatric life support skills: a randomized controlled trial using virtual patients versus video instruction." *BMC medical education* 19, no. 1 (2019): 7.
8. Ali, Shahna, Manazir Athar, and Syed Moied Ahmed. "A randomised controlled comparison of video versus instructor-based compression only life support training." *Indian Journal of Anaesthesia* 63, no. 3 (2019): 188.
9. Tassicker, Brady, Tanebu Tong, Teitinana Ribanti, Angie Gittus, and Bronwen Griffiths. "Emergency care in Kiribati: A combined medical and nursing model for development." *Emergency Medicine Australasia* 31, no. 1 (2019): 105-111.
10. Gabriel, Israel Olatunji, and Joel O. Aluko. "Theoretical knowledge and psychomotor skill acquisition of basic life support training programme among secondary school students." *World journal of emergency medicine* 10, no. 2 (2019): 81.
11. Willmore, Robert D., Damjan Veljanoski, Feray Ozdes, Bethan Stephens, James Mooney, Seamus G. Crumley, Arpan Doshi et al. "Do medical students studying in the United Kingdom have an adequate factual knowledge of basic life support?." *World journal of emergency medicine* 10, no. 2 (2019): 75.
12. Chang, Todd P., Tia Raymond, Maya Dewan, Ralph MacKinnon, Travis Whitfill, Ilana Harwayne-Gidansky, Cara Doughty et al. "The Effect of an International Competitive Leaderboard on Self-Motivated Simulation-based CPR Practice Among Healthcare Professionals: A randomized control trial." *Resuscitation* (2019).
13. Leppänen, Sinikka, Miia Jansson, Hanna-Mari Pesonen, and Satu Elo. "Effectiveness of Education in Improving the Performance of Medical Emergency Team Nurses." *Clinical Simulation in Nursing* 26 (2019): 64-71.
14. Castillo, J., Gomar, C., Rodriguez, E., Trapero, M. and Gallart, A., 2019. Cost minimization analysis for basic life support. *Resuscitation*, *134*, pp.127-132.
15. Milzman, Dave, Andrew Meltzer, and Matthew Paik. "234: MINIMIZING INTERRUPTIONS IN CPR: INTUBATE ANYWAY!." *Critical Care Medicine* 47, no. 1 (2019): 99.