

# Basic Life Support Knowledge in a War-Torn Country: A Survey of Nurses in Yemen

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## Research Article

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# Abstract

**Background:** Successful implementation of Basic life support (BLS) is critical in improving survival rates and outcomes. By extension, health care workers' knowledge and awareness about BLS is also essential. To our knowledge, there is no available literature pertaining to the level of BLS knowledge of health care professionals in Yemen.

**Methods:** Data was collected for this cross-sectional descriptive study from June to August 2020, using a 10-item questionnaire related to cardiopulmonary resuscitation (CPR) and BLS, along with questions on socio-demographic characteristics. Participants were nurses in public and private hospitals located in Al-Rahida, Taiz governance and Hodeidah, Hodeidah governance in Yemen.

**Results:** Among all completed surveys, 53.65% of answer choices for BLS knowledge were correct and 46.35% of answer choices were incorrect. Having a Diploma was associated with higher survey scores ( $P < 0.001$ ) compared to having a Bachelor's degree. Those who said they had ever received training in CPR or received information about CPR had significantly higher scores than those who answered no to these questions ( $P < 0.001$  for both questions).

**Conclusions:** BLS knowledge among nurses in Yemen is comparable to other underdeveloped countries; however, it remains below an acceptable level to ensure maximum survival in the event of cardiac arrest. Future research and efforts should be aimed at implementing strategies to improve BLS knowledge among nurses in Yemen, with a long-term goal of improving BLS knowledge among the non-medical population as well to decrease the burden associated with sudden cardiac death.

## Background

Basic life support (BLS) entails the recognition of conditions such as heart attack, sudden cardiac arrest, foreign-body airway obstruction, or stroke and the subsequent administration of cardiopulmonary resuscitation (CPR) and defibrillation with an automated external defibrillator. <sup>1</sup>The American Heart Association notes that the administration of CPR and defibrillation within the first three to five minutes of collapse can yield survival rates ranging from 49% to as high as 75%. In fact, CPR has been demonstrated to double<sup>2,3</sup> or triple<sup>4</sup> survival from witnessed sudden cardiac arrest. Thus, successful implementation of BLS is critical in improving survival rates and outcomes. By extension, health care workers' knowledge and awareness about BLS is also essential. However, the attitude and level of knowledge of health care professionals varies worldwide <sup>5</sup>. While the demand for BLS courses is continues to rise in developed countries, BLS training in underdeveloped and developing countries is not practiced routinely. For instance, a recent survey in Upper Egypt demonstrated suboptimal and inadequate CPR knowledge among medical students and junior doctors; however, positive attitudes and an eagerness towards training was noted in the participants <sup>6</sup>. Similar results were reported by Saquib et al. in a cross-sectional study of health interns in Saudi Arabia. To our knowledge, there is no available

literature pertaining to the level of BLS knowledge of health care professionals in Yemen. Therefore, the aim of the present study is to evaluate BLS knowledge among nursing staff in Yemen.

## **Methods**

### **Design and Setting**

A descriptive cross-sectional survey was conducted over a 3-month period from June to August 2020, to evaluate the nurses' knowledge about CPR and BLS at the private and public hospitals in AL-rahida city, Taiz governance and Hodeidah city, Hodeidah governance, Yemen. All nurses working in the public and private hospitals in the intended cities were included in this study.

### **Tool of the study**

The questionnaire consisted of two sections. The first section focused on the nurses' demographic and occupational data such as gender, age, level of education, years of work experience, being trained or educated for CPR. The second part contained 10 questions related to CPR and BLS that were developed by the researchers according to the European Resuscitation Council and the American Heart Association guidelines, 2015.<sup>7,8</sup>

Each question included four possible answers; one of which was correct and three incorrect answers, one of them is the phrase "I do not know" to avoid guessing from the participants. One score was allocated to the correct answer and 0 for an incorrect one; therefore, the total scores for the questionnaire range from 0–10. Then, the total score of nurses' knowledge was converted to a percentage, over a range of 0-100%. The questionnaire was translated into Arabic language and then translated back into English to determine the accuracy and precision of the translation. Five experts in the medical and nursing emergency participated in the testing of the questionnaire for content validity. Then, a pilot study was conducted to ascertain the reliability of the questionnaire by distributing it to 20 nurses, which was Cronbach's alpha ( $r = 0.828$ ).

### **Ethical considerations**

Approval of the Research Ethics Committee of Alshifaa Faculty was obtained before conducting the study. Participation in the study was voluntary, and informed consent was obtained from participants after explanation of the study objective.

### **Data analysis**

The Statistical Packages for Social Sciences (SPSS), version 21.0 (IBM Corp., Armonk, NY, USA) was used for processing and analysis of the collected data. Descriptive statistics such as frequencies, percentages and means were used to describe the participants' characteristics and their answers for each item of the questionnaire. Differences in the scores of knowledge and the variables were compared by using Mann–Whitney test for the items of gender, governance, received training in CPR, and received information about

CPR, or Kruskal- Wallis test for the items of age, level of education, and experience. The significance level for all tests was set at  $p \leq .05$ .

## Results

Out of 220 distributed questionnaires, 200 were returned with the response rate (90.9%) The Socio-demographic and work characteristics of nurses are presented in table 1. Approximately more than a half of the participants 113 (56.5%) were male. The mean age of the participants was  $29.89 \pm 8.58$  years, and more than a half of the participants 117 (58.5%) had a diploma. Most of them (43.5%) had experience less than five years. The majority (59% and 54.5%) of participants had received training on CPR and received information regarding CPR, respectively, and an education institution was the major source for this information.

**Table 1.** Socio-demographic and work characteristics of nurses.

Item	Characteristics	n (%)
Sex	Male	113 (56.5%)
	Female	87 (43.5%)
Age	Mean $\pm$ SD	29.89 $\pm$ 8.58
Governance	Hodeidah	100 (50%)
	Taiz	100 (50%)
Level of education	Diploma	117 (58.5%)
	Bachelor	78 (39%)
	Master	5 (2.5%)
Experience	< 5 years	87 (43.5%)
	5-10 years	69 (34.5%)
	>11 years	44(22%)
Training CPR	Yes	82 (41%)
	No	118 (59%)
Received information	Yes	109 (54.5%)
	No	91 (45.5 %)
Source of information	Education institution	47 (43.1%)
	Practice	28 (25.7%)
	Self-learning	17 (15.6%)
	Education institution and practice	17 (15.6%)

This table displays the distribution of sociodemographic and work characteristics among study participants in number (n) and by percentage for each item.

As illustrated in table 2 that describes the nurses' correct and incorrect answers for items of the CPR knowledge questionnaire. The sum total percentage of correct answers was (53.65%). The higher scores (80.5%),(79.5%),(67%) of correct answer for the CPR knowledge was for the items "What are doing for victim if unresponsive and not breathing normally" followed by the item "Position during chest compression", and "BLS meaning", respectively. The nurses ranked the lowest scores (25%, 30.5%, and 44.5%) for the items "The rate of chest compressions", "The ratio of chest compression to rescue breathing for children", and "chocking during food eating and he can't cough " respectively.

**Table 2.** Nurses' correct and incorrect answers for items of CPR knowledge questionnaire

No.	Question	Correct Scores (%)	Incorrect Scores (%)
1	BLS meaning	134 (67%)	66 (33%)
2	What are doing for victim if unresponsive and not breathing normally	161 (80.5 %)	39 (19.5%)
3	correct position of hand during chest compression	101 (50.5%)	99 (49.5%)
4	The depth of the chest compression for adult	103 (51.5%)	97 (48.5%)
5	The ratio of chest compression to rescue breathing for adult	108 (54%)	92 (46%)
6	The ratio of chest compression to rescue breathing for children	61 (30.5%)	139 (69.5%)
7	Time of rescue breathing between the chest compression	107 (53.5%)	93 (46.5%)
8	The rate of chest compressions	50 (25%)	150 (75%)
9	Position during chest compression	159 (79.5%)	41 (20.5%)
10	chocking during food eating and he can't cough	89 (44.5%)	111 (55.5%)
	Total score	1073(53.65%)	368(46.35%)

This table displays the numbers and percentages of correct and incorrect answers for each question 1 through 10 asked on the BLS knowledge survey along with the sum total score of correct and incorrect answers.

Table 3 shows the relationship between the demographic characteristics and knowledge scores. There was no relationship between the nurses' knowledge and the items of sex, age, and years of experience. In contrast, there was a significant relationship between the nurses' knowledge and the items of governance, the level of education, received training in CPR, and received information about CPR.

**Table 3.** Relationship between the demographic characteristics and knowledge scores

Factors	Group	N	Mean Rank	Median, (IQR)	p-value
Gender*	Male	113	101.19	5 (4-6)	0.845
	Female	87	99.60	1 (1-2)	
Governance*	Hodeida	100	111.70	5 (4-6)	0.005
	Taiz	100	89.30	4 (3-5)	
Received training in CPR	Yes	82	78.89	5 (4-6)	0.000
	No	118	131.59	4 (3-5)	
Received information about CPR	Yes	109	131.09	5 (4-6)	0.000
	No	91	63.86	3 (2-4)	
Age category (years) **	< 30	41	110.72	6 (5-6.5)	0.101
	30-39	94	95.55	5 (4-6)	
	≥40	65	101.21	5 (4-6)	
Level of education**	Diploma	117	87.63	5 (4-6)	0.000
	Bachelor	78	120.51	6 (4-7)	
	Master	5	89.60	5 (3.5-6)	
	5-10	69	100.93	5 (4-6)	
	> 10	44	90.35	5 (4-6)	
Experience**	< 5	87	105.29	5 (4-6)	0.562
	5-10	69	100.93	5 (4-6)	
	> 10	44	90.35	5 (4-6)	

This table shows the relationship between BLS knowledge score and the factor groups shown using either the \*Mann-Whitney test or \*\*Kruskal-Wallis test conducted at  $\alpha=0.05$ . The number of participants in each group (N), mean rank, median, interquartile range (IQR), and p-value for each analysis is shown.

## Discussion

To our knowledge, this is the first survey of BLS knowledge among nurses in Yemen. In general, the results of this study are consistent with other similar studies performed in various countries with similar socioeconomic hardships to those of Yemen, namely that nurses in underdeveloped countries lack adequate knowledge of BLS procedures. We found that 53.65% of answer choices for BLS knowledge were correct and 46.35% of answer choices were incorrect among all surveys completed. This result is

similar to results from a study among cardiologists in Istanbul where the median percentage of correct answers was 53%.<sup>9</sup> Medical students at a teaching hospital in Oman had a similar mean score, answering 5.5 questions out of 10 correctly as a whole.<sup>10</sup> In the present study and those in Oman and Istanbul, all participants had a medical background, which may account for the similar results. In contrast, only 33% of general university students in Lebanon said they felt confident in performing CPR, the mean score among student-teachers at a University in South Africa was 4.0 out of 12 points, and among school teachers in Saudi Arabia there were 1387 correct answers given and 1703 incorrect answers given.<sup>11-13</sup> These studies from Lebanon, South Africa, and Saudi Arabia were conducted among the general or non-medical population, which may account for the difference in average scores when compared to studies on medical personnel. Finally, a survey of Nurses in Greece found that 25.9% of participants answered 0 questions correctly out of 8 total questions on BLS knowledge, while only 15.5% answered 5 or more questions correctly.<sup>14</sup> This result from nurses is in stark comparison to the present study. One explanation is how recently the persons taking the survey took a training or refresher course on BLS, as only 1.3% of nurses in Greece had taken a BLS course in the preceding 6 months. Taken together, all of these studies point to the fact that medical personnel, who as a whole should have excellent knowledge of BLS and CPR, do not have sufficient knowledge to ensure maximum chances of survival in the case of cardiac arrest or foreign body obstruction of the airway. Recent studies estimate that out-of-hospital cardiac arrest accounts for up to 10% of total mortality in developing countries.<sup>15</sup> Ensuring adequate BLS knowledge in medical personnel is a first step in the chain of survival for preventing sudden cardiac death. This study shows that improving BLS knowledge among nurses and eventually among the general population in Yemen could go a long way in reducing mortality from cardiac arrest, ultimately saving countless lives. Discussion on implementation of such training and cost benefit analysis are beyond the scope of this study, however the subject has received worldwide attention and there is plenty of data already published to guide an implementation strategy.<sup>16,17</sup> Providing recommendations for improving BLS knowledge in Yemen could be a good topic for future research. On the contrary, the fact that BLS knowledge among nurses in Yemen is comparable to that of other developing countries points to the resilience of the Yemen medical community to the unique socioeconomic hardships in Yemen including war, casualties, famine, an exodus of medical personnel, internal displacement of peoples, and socioeconomic collapse.<sup>18</sup> This leads to increases in trauma-related mortality, infectious diseases, malnutrition, and non-communicable disease, along with worsening access to basic health services such as neonatal maternal healthcare which impacts neonatal and maternal mortality rates.<sup>19</sup> When combined with less trained medical personnel due to attacks on healthcare facilities or emigration such as in Yemen, the end result is increasing mortality and morbidity with decreasing quality of healthcare services.<sup>20</sup>

A survey of Medical Schools in Iraq found deans frequently believed violent conflict had negatively impacted student performance.<sup>21</sup> Medical students themselves felt their training had been impaired, frequently experienced threats to their lives or health as a result of conflict, wanted to drop out 26% of the time, and were uncertain about dropping out another 25% of the time. This survey highlights some of the

hardships that conflict can impart on medical training and the healthcare system. The fact that BLS knowledge among nurses in Yemen has not decreased significantly compared to other underdeveloped nations because of recent conflict will provide a strong foundation for recovery in the future.

The present study found several significant associations which correlated with higher survey scores. Having a Diploma compared to having a Bachelor's degree was associated with higher survey scores ( $P < 0.001$ ). Similarly, those who said they had ever received training in CPR or received information about CPR had significantly higher scores than those who answered no to these questions ( $P < 0.001$  for both questions). This result is consistent with studies among cardiologists in Istanbul ( $P = 0.001$ ), medical students in Oman ( $P < 0.001$ ), and teachers in South Africa ( $P = 0.005$ ). However, a study of female teachers in Saudi Arabia found no association between BLS training and knowledge scores, which the study attributed to the fact that many had not had BLS training in the preceding 2 years. Interestingly, being located in the Governance of Hodeidah was associated with significantly higher scores when compared to being located in the Governance of Taiz ( $P = 0.003$ ). A possible reason for this is that participants from Al-Rahida in the Governance of Taiz are in a rural area without nearby university hospital or BLS training center. In comparison Hodeidah is a more urban environment with a university hospital and training center. This distinction supports the idea of increased BLS knowledge with increased access to training and academic centers. Implementing additional training centers in rural areas would be beneficial.

On the other hand, there was no significant association between knowledge scores and years of experience, age, or sex ( $P = 0.199$ ,  $P = 0.48$ ,  $P = 0.75$ , respectively). These results are in comparison to those of non-medical personnel in Ethiopia, which did find significant association between knowledge score and both age and sex. This contrast highlights the differences that can arise among different cultural backgrounds as well as the difference between medical and non-medical persons. Those in the medical field would be more likely to have training and exposure to BLS, and so these factors would play a dominant role in knowledge scores. In non-medical personnel, where training may be less frequent, other factors may play a dominant role in knowledge scores, such as age or sex, depending on the societal norms and influences.

Questions which participants were most likely to answer correctly included the meaning of BLS, "What are doing for victim if unresponsive and not breathing normally", and "Position during chest compression" (80.5%, 79.5%, 67% correct, respectively). This indicates that nurses in Yemen have a grasp of the basic concepts of BLS. However, the low percentage of correct answers to questions like "The rate of chest compressions", "The ratio of chest compression to rescue breathing for children", and "choking during food eating and he can't cough" indicate that specific knowledge of key BLS procedures resulting in "high-quality" CPR is lacking (25%, 30.5%, and 44.5% correct, respectively).<sup>22</sup>

## Limitations of the study

There are several limitations of this study. As a cross sectional survey conducted among nurses in two governances of Yemen, this study may not be generalizable to other populations and is subject to selection bias and non-response bias. Similarly, the unique socioeconomic factors at play in Yemen present a unique challenge to nurses and the society at large. These factors may impact the concordance of results with those from other countries or from other parts of Yemen. This study only assessed the theoretical knowledge of participants and did not assess the practical skills of participants in performing basic life support.

## **Conclusion**

The findings of this study show that BLS knowledge among nurses in Yemen is comparable to other underdeveloped countries, but that this knowledge is still below an acceptable level to ensure maximum survival in the event of cardiac arrest. Yemen faces unique socioeconomic hardships due to recent violent conflict in the country, and in light of this, the findings of this study are encouraging. Future research and efforts should be aimed at implementing strategies to improve BLS knowledge among nurses in Yemen, with a long-term goal of improving BLS knowledge among the non-medical population as well to decrease the burden associated with sudden cardiac death.

## **Abbreviations**

BLS: Basic life support

CPR: Cardiopulmonary resuscitation

SPSS: Statistical Packages for Social Sciences

## **Declarations**

### **Ethical considerations**

Approval of the Research Ethics Committee of Alshifaa Faculty was obtained before conducting the study. Participation in the study was voluntary, and informed consent was obtained from participants after explanation of the study objective.

### **Consent for publication**

Not applicable

### **Availability of data and materials**

The data that were generated and analyzed in this study are mostly included within the published article. However, source material and the raw datasets are available from the corresponding author upon request.

## Competing Interest

The authors declare that they have no conflict of interest.

## Funding

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## Authors' contributions

SA designed of the study; was responsible for data collection; performed statistical analysis, and formulated results and participated in writing the whole manuscript. He consider a first co-author. CM, RY, BA, and SHA contributed to the conception and the drafting of the paper.

\*Corresponding authors: MA and SA Serviced as a corresponding authors proposed the project, authorized the paper, contributed to the conception, formulation and drafting of the article, participated and supervised the elaboration and every step of the paper writing process and were responsible for coordination of the study and communication with all co-authors. MA, participated in writing the whole paper and revise the whole manuscript. All authors edited and revised the manuscript. All authors read and approved the final manuscript.

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## References

1. Atkins, D. L., Berg, M. D., Berg, R. A., Bhutta, A. T., Biarent, D., Bingham, R., Braner, D., Carrera, R., Chameides, L., Coovadia, A., De Caen, A., Diekema, D. S., Fendya, D. G., Fiedor, M. L., Fiser, R. T., Fuchs, S., Gerardi, M., Hammill, W., Hatch, G. W., ... Zideman, D. (2006). 2005 American Heart Association (AHA) guidelines for cardiopulmonary resuscitation (CPR) and emergency cardiovascular care (ECC) of pediatric and neonatal patients: pediatric basic life support. *Pediatrics*, 117(5).  
<https://doi.org/10.1542/PEDS.2006-0219>
2. Larsen, M. P., Eisenberg, M. S., Cummins, R. O., & Hallstrom, A. P. (1993). Predicting survival from out-of-hospital cardiac arrest: a graphic model. *Annals of Emergency Medicine*, 22(11), 1652–1658.  
[https://doi.org/10.1016/S0196-0644\(05\)81302-2](https://doi.org/10.1016/S0196-0644(05)81302-2)
3. Valenzuela, T. D., Roe, D. J., Cretin, S., Spaite, D. W., & Larsen, M. P. (1997). Estimating effectiveness of cardiac arrest interventions: a logistic regression survival model. *Circulation*, 96(10), 3308–3313.  
<https://doi.org/10.1161/01.CIR.96.10.3308>
4. Holmberg, M., Holmberg, S., & Herlitz, J. (2000). Effect of bystander cardiopulmonary resuscitation in out-of-hospital cardiac arrest patients in Sweden. *Resuscitation*, 47(1), 59–70.  
[https://doi.org/10.1016/S0300-9572\(00\)00199-4](https://doi.org/10.1016/S0300-9572(00)00199-4)

5. Saquib, S. A., Al-Harhi, H. M., Khoshhal, A. A., Shaher, A. A., Al-Shammari, A. B., Khan, A., Al-Qahtani, T. A., & Khalid, I. (2019). Knowledge and Attitude about Basic Life Support and Emergency Medical Services amongst Healthcare Interns in University Hospitals: A Cross-Sectional Study. *Emergency Medicine International*, 2019, 1–8. <https://doi.org/10.1155/2019/9342892>
6. Mohammed, Z., Arafa, A., Saleh, Y., Dardir, M., Taha, A., Shaban, H., Abdelsalam, E. M., & Hirshon, J. M. (2020). Knowledge of and attitudes towards cardiopulmonary resuscitation among junior doctors and medical students in Upper Egypt: Cross-sectional study. *International Journal of Emergency Medicine*, 13(1), 1–8. <https://doi.org/10.1186/S12245-020-00277-X/FIGURES/4>
7. Perkins, G. D., Handley, A. J., Koster, R. W., Castrén, M., Smyth, M. A., Olasveengen, T., Monsieurs, K. G., Raffay, V., Gräsner, J. T., Wenzel, V., Ristagno, G., Soar, J., Bossaert, L. L., Caballero, A., Cassan, P., Granja, C., Sandroni, C., Zideman, D. A., Nolan, J. P., ... Greif, R. (2015). European Resuscitation Council Guidelines for Resuscitation 2015: Section 2. Adult basic life support and automated external defibrillation. *Resuscitation*, 95, 81–99. <https://doi.org/10.1016/J.RESUSCITATION.2015.07.015>
8. Neumar, R. W., Shuster, M., Callaway, C. W., Gent, L. M., Atkins, D. L., Bhanji, F., Brooks, S. C., De Caen, A. R., Donnino, M. W., Ferrer, J. M. E., Kleinman, M. E., Kronick, S. L., Lavonas, E. J., Link, M. S., Mancini, M. E., Morrison, L. J., O'Connor, R. E., Samson, R. A., Schexnayder, S. M., ... Hazinski, M. F. (2015). Part 1: Executive Summary: 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*, 132(18 Suppl 2), S315–S367. <https://doi.org/10.1161/CIR.0000000000000252>
9. Oktay, V., Çıralı, İ. Ç., Baydar, O., & Sansoy, V. (2019). Knowledge and experience of cardiopulmonary resuscitation among cardiologists in clinical practice: A multicenter cross-sectional study. *Anatolian Journal of Cardiology*, 21(6), 296–304. <https://doi.org/10.14744/ANATOLJCARDIOL.2019.53383>
10. Albadi, S., Al-Hadi, H., & Nadar, S. K. (2020). Knowledge and Attitudes toward Basic Life Support among Medical Students in Oman. *Indian Journal of Critical Care Medicine: Peer-Reviewed, Official Publication of Indian Society of Critical Care Medicine*, 24(7), 599. <https://doi.org/10.5005/JPJOURNALS-10071-23475>
11. Alhejaili, A. S., Alghamdi, R. A., & Al-Dubai, S. A. R. (2020). Knowledge and attitude of basic life support skills among female school teacher in Al-Madinah, Saudi Arabia. *Journal of Family Medicine and Primary Care*, 9(5), 2281. [https://doi.org/10.4103/JFMPC.JFMPC\\_320\\_20](https://doi.org/10.4103/JFMPC.JFMPC_320_20)
12. Ojifinni, K., Motara, F., & Laher, A. E. (2019). Knowledge, Attitudes and Perceptions Regarding Basic Life Support Among Teachers in Training. *Cureus*, 11(12). <https://doi.org/10.7759/CUREUS.6302>
13. Shams, A., Raad, M., Chams, N., Chams, S., Bachir, R., & el Sayed, M. J. (2016). Community involvement in out of hospital cardiac arrest: A cross-sectional study assessing cardiopulmonary resuscitation awareness and barriers among the Lebanese youth. *Medicine*, 95(43). <https://doi.org/10.1097/MD.0000000000005091>
14. Xanthos, T., Akrivopoulou, A., Pantazopoulos, I., Aroni, F., Datsis, A., & Iacovidou, N. (2012). Evaluation of nurses' theoretical knowledge in Basic Life Support: a study in a district Greek hospital.

- International Emergency Nursing*, 20(1), 28–32. <https://doi.org/10.1016/J.IENJ.2010.11.001>
15. Mawani, M., Kadir, M. M., Azam, I., Mehmood, A., McNally, B., Stevens, K., Nuruddin, R., Ishaq, M., & Razzak, J. A. (2016). Epidemiology and outcomes of out-of-hospital cardiac arrest in a developing country-a multicenter cohort study. *BMC Emergency Medicine*, 16(1), 1–10. <https://doi.org/10.1186/S12873-016-0093-2/TABLES/3>
  16. Abbas, F., Sawaf, B., Hanafi, I., Hajeer, M. Y., Zakaria, M. I., Abbas, W., Alabdeh, F., & Ibrahim, N. (2018). Peers versus professional training of basic life support in Syria: A randomized controlled trial. *BMC Medical Education*, 18(1), 1–9. <https://doi.org/10.1186/S12909-018-1241-Z/TABLES/6>
  17. García-Suárez, M., Méndez-Martínez, C., Martínez-Isasi, S., Gómez-Salgado, J., & Fernández-García, D. (2019). Basic Life Support Training Methods for Health Science Students: A Systematic Review. *International Journal of Environmental Research and Public Health*, 16(5). <https://doi.org/10.3390/IJERPH16050768>
  18. Cole, J., Alsabri, M., Alsakkaf, L. M., Alhadheri, A., Amin, M., & Nightingale, B. (2021). Conflict, Collapse and Covid-19. <https://doi.org/10.1080/03071847.2021.1952106>, 166(3), 10–19. <https://doi.org/10.1080/03071847.2021.1952106>
  19. Garry, S., & Checchi, F. (2020). Armed conflict and public health: into the 21st century. *Journal of Public Health (Oxford, England)*, 42(3), E287–E298. <https://doi.org/10.1093/PUBMED/FDZ095>
  20. Munslow, B. (2019). Humanitarianism under attack. *International Health*, 11(5), 358–360. <https://doi.org/10.1093/INTHEALTH/IHZ065>
  21. Barnett-Vanes, A., Hassounah, S., Shawki, M., Ismail, O. A., Fung, C., Kedia, T., Rawaf, S., & Majeed, A. (2016). Impact of conflict on medical education: A cross-sectional survey of students and institutions in Iraq. *BMJ Open*, 6(2), e010460. <https://doi.org/10.1136/BMJOPEN-2015-010460/-/DC1>
  22. Olasveengen, T. M., Mancini, M. E., Perkins, G. D., Avis, S., Brooks, S., Castrén, M., Chung, S. P., Considine, J., Couper, K., Escalante, R., Hatanaka, T., Hung, K. K. C., Kudenchuk, P., Lim, S. H., Nishiyama, C., Ristagno, G., Semeraro, F., Smith, C. M., Smyth, M. A., ... Rajendran, K. (2020). Adult Basic Life Support: International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. *Resuscitation*, 156, A35. <https://doi.org/10.1016/J.RESUSCITATION.2020.09.010>