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Evaluating the Impact of ACLS Training at Juzoor Training Center, Palestine (2024–2025): A Pre- and Post-Test Comparative Study Among Healthcare Professionals

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Abstract

Objectives: Advanced Cardiovascular Life Support (ACLS) training courses are designed curricula used to train healthcare professionals (HCPs) in cardiovascular emergencies. To the authors' knowledge, data related to ACLS training conducted in Palestine among HCPs has not been published. Thus, this study aimed to assess knowledge among physicians and nurses before and after ACLS training conducted in Palestine using pre-post knowledge testing.

Methods: This pre- and post-test study enrolled 497 HCPs who completed a 2-day ACLS training course administered at Juzoor Training Center (Palestine) between April 2024 and September 2025. All HCPs included in this study participated in the training curriculum and were tested using the same 50-question multiple-choice questionnaire before and after completion of the training. Additionally, HCPs were evaluated on objective skills stations during a code scenario, addressing several key components of the ACLS curriculum. Participants' knowledge scores were compared using the IBM Statistical Package for Social Sciences (IBM SPSS) version 22. A paired samples t-test was performed on the data. A p-value of <0.05 was considered statistically significant.

Results: Of participants enrolled, 57% were male. Most participants were physicians (n = 253, 51%). The majority of participants scored between 86-100 on the pre-training knowledge test (n = 267, 53.7%). Of those that took the pre-knowledge test, 27 participants (5.4%) scored 70 or less. Compared to the pre-knowledge testing, significantly more participants scored between 86-100 on the post-test evaluation (n =

438, 88.1%, p <0.001). The paired samples t-test produced a statistically significant mean difference in score pre- and post-training (Mean difference = 5.87, SD = 9.27; t(488) = -14.00, p <0.001).

Conclusions: ACLS training was effective at improving the knowledge of HCPs that participated in this study. Curriculum designed and implemented using high-yield standards with periodic simulation training may allow for sustained competency.

Keywords: Advanced Cardiovascular Life Support, ACLS training, Pre-post study, Healthcare professionals.

Background:

The American Heart Association (AHA) created Advanced Cardiovascular Life Support (ACLS), an advanced training program that builds on Basic Life Support (BLS). Since it builds on the fundamental lifesaving skills required in cardiac and respiratory emergencies. Initially, it's a course that should be taken following BLS completion which incorporates basic life support skills like the use of an AED, bag mask, and skilled chest compressions (American Heart Association, n.d.). ACLS's main objective is to investigate and manage cardiovascular emergencies, including cardiac arrest and respiratory arrest. Moreover, pharmacology for cardiac emergencies, airway management, the management of arrhythmias, peri-arrest conditions management like symptomatic bradycardia, acute coronary syndrome and stroke, team communication, and leadership in resuscitation are also covered in this course (American Heart Association, n.d.). According to studies, this training has been shown to significantly

improve cardiac arrest outcomes (Meaney et al.,2010). For those with advanced experience, they can enroll in the ACLS for Experienced Providers (ACLS EP) course, which has more extensive training in post-cardiac arrest care, handling difficult resuscitation situations, and ECG interpretation. Our study is a comparative study of pre- and post-tests, aimed to measure participants' awareness before and after they have completed the ACLS course.

The worldwide demand for skilled medical practitioners exceeds the supply, so the need for this training is increasing (Delasobera et al., 2010). Here comes, American Heart Association (AHA) to put the needed protocol to figure this out ("AHA builds ACLS on the foundation of lifesaving BLS skills, emphasizing the need of CPR skills, with a continuous update on the protocols (*Advanced Cardiovascular Life Support (ACLS)*, n.d.). Furthermore, AHA provides these training sessions for healthcare professionals who participate in the management of emergent cardiopulmonary cases and other emergencies, for ER working staff, and for new board physicians (*Advanced Cardiovascular Life Support (ACLS) Course Options*, n.d.). Here in Palestine, Juzoor for Health and Social Development serves as a key local partner accredited by the AHA to provide ACLS training. Juzoor implements AHA-endorsed protocols in collaboration with the Ministry of Health, and AHA-certified doctors (Juzoor,2025)

Living in Palestine is always a challenge, geographically, politically, and financially. A lot of studies are done to explore the effect of these limitations on students and physicians' knowledge. Restricted movements, limited clinical exposure, lack of

certified trainers, financial burden and poor infrastructure are some of the limitations Palestinians face due to being born in an occupied growing country (Shahawy & Diamond, 2016. As a result of living in a place that seems like prison, Palestinian students showed to be affected by impediment to movement, which makes rotations at tertiary hospital difficult to impossible, so more time to access their train, leading to less time to look for practices like ACLS sessions. (Hamshari et al., 2024). However, ACLS practice needs full attendance and participation which may be difficult because of unpredictable travel delays, and checkpoints closure (Amro et al., 2024).

Objective:

To evaluate the Impact of ACLS Training at Juzoor Training Center, Palestine (2024–2025): A Pre- and Post-Test Comparative Study Among Healthcare Professionals

Methods:

A structured ACLS course was delivered to medical doctors and nurses at a Palestinian hospital. Pre- and post-course knowledge assessments were conducted, alongside practical evaluation in simulated mega code scenarios. Performance metrics included adherence to ACLS algorithms, defibrillation timing, airway management, and team communication

Study design and population:

This study was conducted from April 1, 2024, to Sep, 2025. the training was conducting 497 participants, ACLS course was provided by experience instructor over 2 days over, both the pre-test and post-test consisted of 50 multiple-choice questions,

Statistical Analysis:

Statistical analyses in this study were conducted using IBM SPSS software versions 22. Categorical variables were summarized as frequencies and percentages, to compare two dependent groups, the paired t-test was applied when the data met normality assumptions. Throughout the study, a p-value less than 0.05 was considered statistically significant

Results:

The study included a total of 497 participants, of whom 57% (n=283) were male (figure 1). Among the participants, 51% (n=253) were doctors and 49%(n=244) were nurses (figure 2)



Figure 1. Gender distribution of healthcare professionals enrolled in the ACLS training program (n = 497).

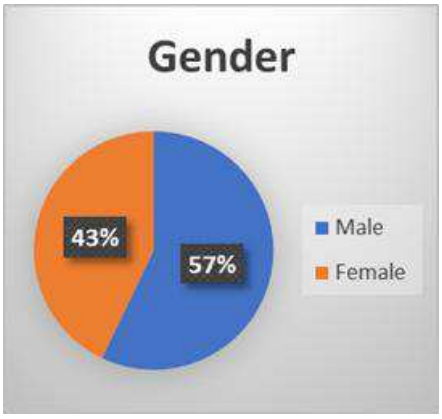


Figure 2. Professional distribution of healthcare professionals enrolled in the ACLS training program (n = 497).

Table -1 Examining the pre-test results of the participants included in the study, it was found that most participants (54.5%) scored between 86–100 on the pretest. Only a small percentage (5.5%) scored 70 or below, indicating strong baseline knowledge (table 1).

Table -1 Pretest Score Distribution

		Frequency	Percent	Cumulative Percent
Valid	0-70	27	5.4	5.5
	71-85	203	40.8	45.5
	86-100	267	53.7	100.0
	Total	490	98.6	

table -2 Examining the post -test results of the participants included in the study, it was found that most participants (88.1) scored between 86–100 on the posttest. a small percentage (5.5%) scored 70 or below

Table 2 Posttest Score Distribution

		Frequency	Percent	Cumulative Percent
Valid	71-85	59	11.9	11.9
	86-100	438	88.1	100.0
	Total	496	99.8	

To evaluate whether there was a meaningful change in participants' scores, a paired samples t-test was carried out comparing the pre-test and post-test results. The findings showed a clear and statistically significant difference between the two, with participants scoring higher after the intervention. Specifically, the mean difference was about **5.87 points** (SD = 9.27), and the results were statistically significant, **t (488) = -14.00, p < .001**. The confidence interval (from **-6.69** to **-5.05**) suggests that the improvement wasn't due to chance. Overall, these results indicate that the intervention was effective in improving performance. (table 3)

Table(3)

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	pretest - posttest	-5.87117	9.27084	.41924	-6.69491	-5.04742	-14.004	488	.000

Discussion:

Based on the comparison of pre-test and post-test outcome scores, the research aims to quantify the effect of ACLS training on the knowledge base of health professionals. The paired samples t-test ($t(488) = -14.00$, $p < .001$) confirmed the results, and the results indicated a statistically significant improvement in participants' performance following training. This implies the participants' comprehension of the ACLS content was enhanced significantly by the course.

Substantial baseline level of theoretical knowledge was determined from the observation that more than half of the participants (54.5%) had obtained scores in the highest range (86–100) on the pre-test prior to training. The plurality of participants entered the course well-prepared, with only 5.5% of them achieving a score less than 70. The effectiveness of the course material and instruction was further supported by the fact that almost all participants (88.1%) scored at post-intervention in the top range.

It seems that all professional categories benefited equally from the course. In general, a trend of consistent improvement among participants was observed, even if the fact that statistical comparisons within individual groups were avoided in this research. A rise in high post-test scores suggests that the training strategy, which probably involved combining theoretical ideas with practice, effectively supported knowledge acquisition.

According to demographic data, the sample split roughly evenly between physicians (51%) and nurses (49%) and had 57% male responders. This ratio would indicate that the education was accessible to a wide variety of health care providers and appropriate. There were no subgroup analyses by experience, gender, or profession in this study and may be investigated in future research.

Some limitations must be stated. The research did not assess long-term retention or the transfer of functional skills but only knowledge gain as evidenced by pre- and post-test scores. Additionally, those variables that may impact baseline knowledge and learning outcomes, such as age, years of experience, and working environment, were not taken seriously into account in analysis.

In spite of these restrictions, the results mark that systematic ACLS training is an effective method for raising expert knowledge levels among doctors. Subgroup analysis, follow-up measurement, and measures of practical skill performance after training can all be incorporated in future research to expand upon this study.

Conclusion

The outcomes of this study offer strong evidence that Advanced Cardiovascular Life Support (ACLS) training highly increases the level of knowledge in health practitioners in Palestine. The statistically significant difference between pre- and post-test results reiterates the adequacy of systematic, evidence-based education to enhance clinical decision-making and readiness for cardiac emergencies.

While many of the issues with the Palestinian health system are well on the record, including lack of mobility, limited access to high-tech clinical settings, and financial constraint, the program showed that high-quality resuscitation training can translate into measurable gains in competency. This discovery illustrates how robust and responsive healthcare workers can be if they are granted access to standardized training courses that are on the international map.

To maintain these advantages, institutions should continue to be committed to ongoing professional development, regular refresher courses, and integration of ACLS principles into regular clinical practice. Future research would evaluate long-term retention of knowledge, translation of acquired skills into clinical outcomes, and the system advantage of mass ACLS certification among healthcare institutions.

Briefly, ACLS courses are not only a necessary tool for educating people, but also a smart tool for investing in improving emergency cardiovascular care within the healthcare sector in Palestine in terms of quality, efficiency, and outcomes.

Declarations:

The study was conducted in accordance with the ethical standards of the institutional research committee and the principles of the Declaration of Helsinki.

Ethics approval and consent to participate

Ethical approval for this study was obtained from Arab American University. All participants provided informed consent prior to participation in the study. Participation was voluntary, and data were collected anonymously and used solely for research purposes.

The Ethical Considerations/Ethics Approval and Consent to Participate section has been revised and clarified in the manuscript. No personal or directly identifiable participant information was collected during the study.

Questionnaire

The pre-course and post-course examinations used in this study were based on the American Heart Association (AHA) ACLS pre-course and post-course tests. The examinations were administered according to the original AHA materials. The test content is copyrighted by the American Heart Association, and all associated intellectual property rights remain with the AHA. Therefore, the examination questions have not been reproduced or uploaded as a supplementary file.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due to privacy considerations but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

SA conceptualized and designed the study. MA contributed to data collection, and performed the statistical analysis. SA, LS drafted the manuscript. MA contributed to data interpretation and critically revised the manuscript. All authors read and approved the final manuscript.

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