Advanced Life Support Video Training Modalities: A Literature Review

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Introduction: The knowledge and skills of health workers regarding Advanced Life Support (ALS) are an important part that needs to be trained and improved with appropriate training methods in handling cardiac arrest patients. This literature review aims to determine the effectiveness of video training modalities to increase the knowledge and skills of health workers about ALS.

Methods: Literature study using 1 article that has been published and peer-reviewed from PubMed, CINAHL, and ScienceDirect using the keywords effectiveness, advanced life support, video-based learning, nurses, knowledge, and skills. Searches were limited to full-text articles, experimental designs, publications from 2014 to 2023, and selection of articles in research using flowchart prisma.

Results: Analysis of fifteen articles or journals related to the research objectives found that all journals stated that the video training method was effective in increasing the knowledge and skills of respondents in basic life support practices and advanced life support. The implementation of ALS training in a hybrid manner, namely the use of non-face-to-face learning methods using video with face-to-face training led by an instructor, showed no significant difference, but video training was preferred because it provides convenience regarding time, place of implementation, and more training participants.

Conclusion: ALS training must be given to nurses at least once a year, so it can be suggested to institutions to use the learning video method as a method of providing training.

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INTRODUCTION

Cardiac Arrest is the leading cause of death outside hospitals and inside hospitals[1]. Research in the United States shows as many as 70% of Out-of-Hospital Cardiac Arrests (OHCAs) occur at home, and about 50% are not witnessed [1], [2]. The outcome of OHCA was poor; only 10.8% of adult victims with nontraumatic heart attacks who had received resuscitation efforts from Emergency Medical Services (EMS) survived hospitalization. In-Hospital Cardiac Arrest (IHCA) had better outcomes, with 22.3% to 25.5% of adults still surviving [1]–[3]. This depends on the officer’s ability to assist[2]. In a study conducted at a tertiary medical institution in Korea, the survival rates of heart attack patients in hospitals for 24-hour survival and discharge survival were 23.7 and 6.4%, respectively [1], [4]. These findings may be related to the healthcare provider’s ability to perform Cardiopulmonary Resuscitation (CPR), in addition to the patient’s age and health status, and also Advanced Life Support (ALS) [3], [4].

Advanced Life Support is the continuation of patient care after basic life support is well implemented. ALS aims to improve and restore ventilation, spontaneous circulation, and stability of the cardiovascular system[5], [6]. ALS procedures require certain medications and special equipment such as drug and fluid administration, electrocardiography, and fibrillation treatment. ALS and Cardiopulmonary Resuscitation (CPR) administered at the right time greatly help reduce mortality in medical emergencies [2], [4], [7]. Cardiopulmonary Resuscitation/Basic Life Support (BLS) and ALS competencies are fundamental skills that healthcare workers must possess [2], [8]. Previous research of medical professionals, nurses, and dentists has shown that the basic life support knowledge and skills of health workers are low [8]–[10]. There are differences in the quality of basic life support provided by health workers, and deficiencies in the implementation of basic life support including inadequacy at depth heart compression and the number/frequency of heart compression [8], [9], [11].

Nursing requires adequate knowledge and skills related to how to detect cardiac arrest and treat patients, especially in emergency rooms or other treatment rooms [4], [12]. The results of previous studies found that only 45% of medical personnel are confident that they can save patients' lives with their current ALS knowledge and skills[5]. Another study found that specialist nurses' knowledge is still lacking and requires training on ALS to provide care to patients in high-risk settings for cardiac arrest [13], [14]. This is in line with several other studies that mention that three to six months after ALS training, the effect decreases, and retraining is needed to maintain efficacy [4].

ALS training is very important to be given to health workers regularly and continuously [5], [6]. Training related to ALS can be conducted by various methods such as lectures, discussions, simulations, role play, and audiovisual case studies [15]. The selection of training methods is adjusted to the purpose of training and each method has disadvantages and advantages [2], [11]. Based on the results of previous research,
training methods that are widely used related to ALS training such as live training, video recording, hybrid team-based simulation, training online, and video-based training [2], [10]. Video-based training is now widely used, where this method has the advantage of having elements of sound and images, can overcome the limitations of time and distance, and can develop the imagination of learners [2], [15].

Refreshing ALS knowledge and skills and the existence of various independent learning media in its implementation are very important. Researchers are very interested in conducting a literature review to determine the effectiveness of the video training method to increase the knowledge and skills of health workers about ALS.

METHODS
The design used in this study is a literature study using a comprehensive strategy, such as searching articles in international research journal databases by searching through the internet using three databases, namely PubMed, CINAHL, and ScienceDirect. The keywords in this literature review are adjusted to the Medical Subject Heading (MeSH) consisting of effectiveness, advanced life support, video-based learning, nurses, knowledge, and skills. Inclusion criteria used in the selection of studies for the literature review are original research (quantitative, qualitative, or mixed methods), full-text articles, research related to training videos, nurses' knowledge and performance about ALS, experimental design articles published from 2014 to 2023 and articles in English. While the exclusion criteria are other health workers, learning media other than videos, and articles in the form of systematic reviews, and meta-analyses. 334 articles were obtained that were similar to the topic then their eligibility was examined, and 16 articles were taken for analysis through analysis of objectives, topic suitability, research methods used, sample size, sample limitations, results of each article, and limitations that occur.
RESULTS

The main focus of this literature review is the method of training videos to improve the knowledge and skills of health workers about ALS. Based on the results of a literature search, 15 articles were found that fit the research objectives, divided into two major themes, namely Advanced Life Support. Interventions given to research on ALS using Video-Based Training. Overall, each study discusses the effectiveness of learning with video interventions, simulations of increasing knowledge and skills in both ALS and BLS and overall delivering significant results [4], [6], [7], [16]–[23].
<table>
<thead>
<tr>
<th>Author</th>
<th>Population, Sample</th>
<th>Methods</th>
<th>Summary of Result</th>
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<tr>
<td>Jang et al [4]</td>
<td>Nursing student Sample: 50 Participant</td>
<td>Experimental study using a randomised control group design.</td>
<td>Knowledge scores decreased significantly in both groups. The skills performance decreased from 27.5 to 26.68 in the experimental group, while it decreased significantly from 27.95 to 16.9 in the control group (p &lt; 0.001)</td>
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<td>Ali et al [16]</td>
<td>Sample 109 student</td>
<td>A randomised controlled</td>
<td>Response to compression time (RCT) was significantly shorter in VBD as compared to IBD</td>
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<td>Saidu et al[17]</td>
<td>Nurses 150 Nurse</td>
<td>True control study</td>
<td>There were no significant differences between the intervention group and control group both CPR knowledge and skills.</td>
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<td>Jeong et al[6]</td>
<td>226 general ward nurses 117 to the intervention group 109 to the control group</td>
<td>A quasi-experimental pretest-post-test design with a comparison group</td>
<td>The IG’s ACLS performance significantly improved after the training. The HTAS forward nurses was effective at enhancing the nurses’ ACLS performance</td>
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<td>Shrestha et al[19]</td>
<td>Health care personal Total of 576 participants (435 clinical doctors, 92 nurses/paramedics, 18 non-clinical doctors and 41 intern doctors</td>
<td>Descriptive cross-sectional study</td>
<td>Successfully completed the training. The difference in post test scores among the different occupational background was not significant.</td>
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<td>Tobase et al [23]</td>
<td>Nursing student undergraduate 62 participants</td>
<td>Quasi-experimental study</td>
<td>The online course contributed to learning of basic life support.</td>
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<td>Aljohani et al [7]</td>
<td>Saudi student nurses 123 nursing students</td>
<td>Quasi-experimental study</td>
<td>The test results showed that there were statistically significant differences between the mean scores of pre-tests and post-test, indicating that simulation has an effect on increasing the ACLS knowledge.</td>
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<tr>
<td>Kose et al [22]</td>
<td>Nursing student 65 nursing students</td>
<td>A non-randomized quasi-experimental study</td>
<td>Level of knowledge and practical skill scores were higher compared to pre-training scores.</td>
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<td>Tobase et al [20]</td>
<td>94 nursing students</td>
<td>Quasi-experimental study</td>
<td>The increase in the average grade after taking the online course was significant.</td>
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<td>Umuhoza et al [21]</td>
<td>Nursing paediatric 57 nurses</td>
<td>A prospective, before-and-after educational intervention study was performed</td>
<td>Knowledge and high-quality one-rescuer CPR skills improved significantly immediately after the training</td>
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<tr>
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<td>Zia Ziabari et al [24]</td>
<td>Medical students 119 medical students</td>
<td>A quasi-experimental study</td>
<td>The mean awareness score of medical interns increased significantly in intervention and control group at second examination. But mean difference of awareness score, before and after the education, was significantly higher in intervention group.</td>
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<td>Moon and Hyun [25]</td>
<td>120 nursing students</td>
<td>A randomized controlled design</td>
<td>The CPR blended learning program that integrates video and face-to-face lectures was effective in enhancing the knowledge and attitudes of nursing students.</td>
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<td>Park et al [26]</td>
<td>79 nursing students</td>
<td>Quasi-experimental study</td>
<td>Blended E-learning, with self-directed repetitive learning, was more effective in improving nursing competence, self-efficacy, problem solving, and psychomotor skills for cardiopulmonary resuscitation and defibrillation than conventional practical education.</td>
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<tr>
<td>Napp et al [27]</td>
<td>808 students</td>
<td>Cluster randomised, controlled, single blinded study</td>
<td>Online education is an effective alternative for preparing prospective BLS instructors. By using free online courses, people that are motivated could independently acquire the skills necessary to become instructors and realize low-cost BLS training in schools.</td>
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<td>Zhou et al [29]</td>
<td>60 trainee nurses</td>
<td>Quasi-experimental study</td>
<td>Compared with the traditional teaching methods, the effect of combined mode of MOOC micro-video in emergency nursing practice is the same as that of traditional teaching methods, but the satisfaction is higher, so it is more suitable to be used in nursing practice during the COVID-19 epidemic period, so as to effectively reduce the cross-infection between doctors, nurses, and teaching staff.</td>
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**DISCUSSION**

Previous research that has been described states that the effect of the training video method is effective in increasing the knowledge and skills of respondents in the practice of basic life support and advanced life support. However, its significance is currently unclear due to the diversity of research methods. The heterogeneity in question is
related to the research design, research samples, and research methods used. The diversity of research designs in question are quantitative designs, qualitative designs, and mixed methods designs. The number of different research samples is also included in the heterogeneity of the study.

ALS training for nurses is very important to be carried out repeatedly [14], bearing in mind the results of previous research that six months after ALS training, nurses' knowledge and skills about ALS decreased [5], [6]. Research conducted by Jang et al. [4] shows that self-study methods with learning videos help improve knowledge, self-abilities, and skills related to ALS [4]. The video made is a recording of the skill test process of each participant during training, then the video is sent to the experimental group through the mobile messenger application once a month for three months, and it was not sent to the control group [4], [17]. Training with video provides convenience regarding the time and place of implementation, videos can be viewed at any time and can also be played repeatedly [12], [18]. But the weakness of this method found in this study is that there is no supervision of participants in watching the video [4]. The decline in RCTs in video-based training could be due to clear video instruction to practice, images, and contextual reality that remove barriers to learning [16]. The existing literature suggests that students' learning abilities are enhanced by the incorporation of multimedia, such as images, audio, and video because it uses a variety of stimulating modalities senses and makes the audience more receptive to data [11], [15].

Online BLS/ALS training has been recommended as an effective alternative to facilitate skill retention as access to such training is not bound by time or location [10], [14], [23]. Combining various learning media with simulations can increase the effectiveness of team-based ACLS training [21], [22]. Studies conducted by [6] show that ACLS training is hybrid, which includes a mixture of non-face-to-face methods using videos or computer-based course materials, along with instructor-led face-to-face training using ACLS simulations, there was no significant difference, where the two methods were effective in increasing knowledge and nurses' skills about ACLS [11], [20]. Different findings suggest hybrid methods are more effective in facilitating knowledge retention and performance compared to standard instructor-led training [10] [18].

The training method in the form of videos has been widely applied because of various advantages and also seen from the results when compared to other methods there is no difference [11], [20], [24]. This is shown based on the results of a study in Northwest Nigeria that showed no significant difference between the self-instruction video training method and the instructor-guided direct training method on the level of knowledge and skills of CPR in nurses [12], [21], [30]. Self-instruction video training methods are suggested to be used to train more nurses in a more cost-effective manner to maximize the utilization of resources and nursing care quality [9], [12], [13] Knowledge and skills on basic life support improved significantly after the provision of training regardless of the respondents' occupation.
Universal national video-based training modules in adapted languages are very effective to be developed focusing on all health workers in urban as well as rural [19] [21],[22]. Subgroup analysis suggested that digital resuscitation training may consider using a mixed learning approach with virtual patients, computer screen-based, video-based learning theory, and assessment, especially for CPR training among health profession ALS [28]. In [29] research, the remote teaching practices use Combined Mode Massive Open Micro-Video Course for intern students in the Department of Emergencies [29],[31]. During the COVID-19 Epidemic Period stated the combined mode effect of the MOOC micro-video in emergency nursing practice is the same as the effect of the traditional teaching method but with higher satisfaction. The critical role of repetitive periodic CPR training courses is to ensure that nurses are competent, up-to-date, and confident in the event of cardiac arrest which is strong evidence to support the practice of nursing in the life-saving emergency procedure of CPR [29],[32].

CONCLUSION

The learning process through videos has proven effective in improving nurses' knowledge and skills about ALS. This is very useful considering that knowledge and skills of BLS / ALS in nurses are very important to improve the quality of service and this training must be done at least once a year. The use of the video method provides convenience in its implementation and can include many participants.

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CONFLICT OF INTEREST

No conflict of interest has been declared by any of the authors.

AUTHOR CONTRIBUTIONS

Each author significantly contributed to the following aspects of the paper: (1) formulating and planning the study, (2) providing their final approval for the submitted version and thoroughly reviewing the article's content, (3) reviewing the article's content and (4) reviewing the article's content.

ETHICAL APPROVAL

No ethics approval required as this is a Article Review.

REFERENCES


