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Performance and retention of basic life support skills improve with a peer-led training program

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ABSTRACT

Background and purpose: Pharmacy students' performance and retention of Basic Life Support (BLS) skills were evaluated 120 days after completion of a peer-led BLS training program.
Educational activity and setting: This was a single-center, parallel group, observational study. Doctor of pharmacy (PharmD) students in their third professional year completed a peer-led BLS training program (n = 148) and participated in a high-fidelity mannequin simulation activity 120 days later. Students were randomly assigned to rapid response teams (n = 24) of five to six members and the American Heart Association's standardized form for BLS assessment was used to assess BLS skills performance. The performance of skills was compared to that of students two years prior to the implementation of the peer-led BLS program.
Findings and discussion: Students who received peer-led BLS training demonstrated retention of BLS skills 120 days after the BLS training program. The teams also displayed significant improvement of the skills evaluated when compared to student teams prior to implementation of the peer-led training (n = 22). Improvement was demonstrated for assessment of responsiveness (96% vs. 41%, $p < 0.001$), assessment for breathing (100% vs. 32%, $p < 0.001$), assessment for pulse (96% vs. 36%, $p < 0.001$), and administration of appropriate ventilation (100% vs. 32%, $p < 0.001$). Numerical superiority was exhibited for high-quality cardiopulmonary resuscitation (CPR) initiation by teams who received peer-led training (100% vs. 86%, $p = 0.101$).
Summary: Students who received peer-led BLS training demonstrated significant improvement in BLS skills performance and retention 120 days after the training program. Data suggests that peer-led BLS training can improve student BLS skills performance and retention.

Background and purpose

Cardiovascular disease, specifically cardiac arrest, is a leading cause of death in the United States.[1] The 2017 Heart Disease and Stroke Statistics Update estimates that about 356,500 people experienced out-of-hospital cardiac arrests as of 2015.[2] Basic life support (BLS) is the basis for saving victims of cardiac arrest. This includes several components such as cardiopulmonary resuscitation

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(CPR) and defibrillation.[3] Due to the prevalence of cardiac arrests occurring in public and private settings, bystander BLS skills are critical in the survival of sudden cardiac arrest victims, as there is a 7–10% reduction in the chance of survival for each minute that CPR is postponed.[4] Similarly, high-quality CPR performance is essential for in-hospital cardiac arrest victims, with return to spontaneous circulation decreasing by 30% if rescuers compress poorly.[5] CPR training for healthcare students and professionals has been recommended for more than 50 years.[6] However, variations in rescuer BLS skills performance as well as patient survival have been noted, thereby requiring improvement of the quality of BLS provided in saving lives.[1]

Peer-led (students teaching their student peers) resuscitation training has shown to be a beneficial approach to teach high-quality CPR, with training of the peer-teacher being a critical component.[7–10] While successful course completion and satisfaction have been described in the literature for peer-led resuscitation training, evaluation of skill retention has been limited to chest compression technique in medical students.[11]

Simulation training has been an effective strategy used within health professional education to teach essential skills while improving learning outcomes.[12–18] Rescuer abilities during medical emergencies may be improved through the use of low-fidelity simulation mannequins during BLS training. Based on American Heart Association (AHA) standards, simulation is incorporated into the BLS training course to facilitate skills practice and testing. The AHA Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care highlight the techniques required for healthcare providers.[19] At the time of this study, the 2015 AHA BLS course materials had not been fully implemented by the AHA. Therefore, we used the 2010 materials, which allowed for a better comparison to the student teams prior to implementation of the peer-led BLS training. Incorporation of simulation into BLS training is in accordance with guidance from the Accreditation Council for Pharmacy Education (ACPE), which develops criteria for doctor of pharmacy (PharmD) degree programs in the United States (US). ACPE directs that “simulated practice experiences may be used to mimic actual or realistic” patient care experiences.[20]

Additionally, student pharmacists are required to document CPR course completion to participate in advanced training and experiential opportunities, such as immunization administration and advanced cardiac life support (ACLS). Students at the Philadelphia College of Pharmacy (PCP) at University of the Sciences were historically required to identify a CPR course to complete on their own through any provider. However, during simulation training in Spring 2010 and 2013, third year PharmD (P3) students were noted to have inadequate BLS skills.[12,13] Only 33–40% of student teams checked for a pulse or breathing and appropriately provided breaths.[12,13] The poor BLS skills of the student pharmacists resulted in reassessment of the method for delivery of CPR training at the institution. In Spring 2014, the institution required student pharmacists obtain BLS training in a course led by BLS peer instructors. The CPR Leadership Team was founded to provide peer-led BLS training on campus through the AHA's BLS course. BLS training for pharmacy students was internalized and the University of the Sciences became a training site for the AHA's BLS course with 731 healthcare students [pharmacy (n = 614), physical therapy (n = 90), occupational therapy (n = 26), physician assistant (n = 1)] trained by their peers as of January 2016. In spring 2016, the interprofessional CPR Leadership Team was composed of seventeen health professional student instructors [pharmacy (n = 15), physical therapy (n = 1), physician assistant (n = 1)]. After training in BLS through the AHA, potential candidates for the CPR Leadership Team completed an application and interview process. Selected students were trained as BLS instructors in accordance with AHA standards, which has defined instructor training criteria. The faculty advisor for the CPR Leadership Team is an AHA Training Center Faculty (TCF) member who is able to facilitate instructor training. The students selected to join the CPR Leadership Team aligned with the local AHA Training Center and completed an Instructor Candidate Application. They completed the AHA BLS Instructor Essentials online course and completed the BLS instructor classroom course with the AHA TCF member. To finalize their instructor training, the students were monitored teaching a BLS course by the AHA TCF member.

P3 students were evaluated for BLS skills performance and retention 120 days after training in Fall 2015. Based on AHA standards with training being valid for two years, students would be expected to retain skills during this time frame.[19] In addition, evaluation 120 days after training aligns with previous literature describing ACLS knowledge and skills retention following simulation training.[13]

These students achieved the AHA learning objectives during their peer-led BLS training course, including “initiate the Chain of Survival, perform prompt, high-quality chest compressions for adult, child, and infant victims, initiate early use of an automated external defibrillator, provide appropriate rescue breaths, demonstrate two-rescuer team CPR, and relieve choking.”[19] Students are required to exhibit these learning objectives during the course and successfully pass the examination with a score of at least 84%.[19] While BLS course completion cards are valid for two years, several studies have reported various findings of the durability of high-quality CPR skills for trained individuals. It has been shown that BLS skills retention is poor within the first year of training.[21] It has been reported that for BLS, specific skill retention varies, with compression techniques being better maintained six or 12 months after training.[22] Long-term retention of BLS skills, up to 12 months, has been demonstrated for participants who received a review of the skills six months after the original training.[23]

Given the prior abysmal performance of the pharmacy students for essential BLS skills, the documented benefits of simulation training, and the lack of data regarding the impact of peer-led instruction on pharmacy student BLS skills performance and retention, we sought to assess pharmacy students’ ability to perform and retain BLS skills 120 days after a peer-led BLS training program.

Educational activity and setting

To assess the impact of the peer-led BLS instruction, a subset of the 731 peer-trained students was compared to historical controls in a simulation activity utilizing a high-fidelity mannequin as an active-learning platform. The goal for this learner-centered activity was for teams to provide optimal BLS and ACLS care for the simulated patient in cardiac arrest, but only adult BLS skills were assessed