

## RESEARCH ARTICLES

# Advanced Cardiac Life Support (ACLS) Certification: An Innovative Course for Pharmacy Students

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**Background.** Midwestern University College of Pharmacy-Glendale in Glendale, Arizona, offers an elective course in advanced cardiac life support (ACLS), allowing students to obtain certification. Teaching methods, course format, and student feedback, along with the results of a telephone survey of all accredited colleges of pharmacy, are reported.

**Methods.** Teaching formats include traditional lectures, student role-playing, and hands-on activities. Students evaluated the course upon completion. Colleges of pharmacy were contacted by telephone to determine whether ACLS certification is offered to their students.

**Results.** Student feedback was positive and indicated a high value for the teaching formats used. To date, 176 of 178 students have successfully achieved certification. Of the 86 colleges of pharmacy surveyed, only one other college offers an ACLS certification course.

**Conclusions.** This course provided students with the knowledge and skills to obtain ACLS certification by integrating curriculum information with application activities that enhanced student learning. Only one other college of pharmacy offers ACLS certification.

**Keywords:** advanced cardiac life support, cardiology, curriculum

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## INTRODUCTION

For centuries the most common method of teaching and learning in a formal setting has been the lecture. Although it remains the primary method of instruction at many institutions, the traditional lecture is one of the poorest methods in terms of material retention, critical thinking, and problem-solving skills. The lecture has dominated in part because it is a remarkably easy way for one instructor to quickly convey the material to any number of students. In its purest form, the lecture may discourage students from asking questions, thinking analytically, or developing associations between previously taught material and new information.

The American Association of Colleges of Pharmacy (AACP) has called upon the implementation of a variety of instruction techniques to be employed for the instruction of pharmacy students.<sup>1</sup>

With regard to the instruction of providing pharmacy care, AACP lists 7 different teaching formats to assist with the development of patient care skills. In addition to the traditional lecture and examination, developmental discussions, simulations, questions, early practice experience, and presentations may have distinct

advantages for various aspects of pharmacy practice. Role-playing simulations and presentations also serve to improve the students' communication skills.<sup>1</sup>

A modified mastery-based approach for evaluation has also been studied as a tool to assist students in the learning and application process.<sup>2</sup> Information was presented in small subtopics that were immediately followed by a set of questions that required students to use the newly taught material to address specific patient cases. This method of enhancing contextual transfer of knowledge decreased study and examination anxiety and may have also served as an in-class evaluation tool.<sup>2</sup> Combining a variety of available teaching methods may serve to optimize the transfer of knowledge to meet the individual student learning needs.

Midwestern University College of Pharmacy-Glendale (MWU-CPG) offers an innovative course titled, "Patient Care Issues in Critical Care Settings and Advanced Cardiac Life Support (ACLS) Certification." The course provides students with the opportunity to complete ACLS training and certification. This elective course uses a variety of teaching formats, including interactive lectures, simulations, hands-on activities, presentations, and role-playing, to enhance the transfer of knowledge and enrich student learning.

## METHODS

The 10-week, 3 credit-hour elective course uses a

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variety of teaching modalities to provide an interactive learning environment, increase retention of material, and improve students' abilities to apply information to real life situations. Students are required to have completed Basic Life Support training during their first year of the 3-year curriculum at MWU-CPG. This course is offered to students in their last didactic quarter of the second year, immediately before their advanced practical training begins. A review of conditions and patient care issues within a critical care setting, basic electrocardiogram (ECG) interpretation, and exposure to practicing pharmacists in nontraditional roles are provided. A nationally recognized and certified ACLS instructor provided the instruction and evaluation necessary for students to officially become ACLS certified for a nominal fee.

Successful completion of the course required attendance and participation in addition to traditional examinations. A small fee of \$80 per student was required for training and obtaining certification. This was the only source of payment to the ACLS instructor. Instructional formats included the lecture, case-based discussions, role-playing scenarios, workshops, small group presentations, and hands-on experience using ACLS training mannequins with defibrillators and intubation equipment. The ACLS component of the course required both written and ACLS scenario-based examinations with instructional mannequins, as dictated by the American Heart Association (AHA). Various healthcare providers were invited to play an active role in the instruction and provide a "real-world" perspective to the didactic material.

We first introduced the course syllabus, expectations, goals, and objectives for the course. The first 2 class meetings were devoted to course introduction and discussing the management of common conditions encountered in intensive care units. Students were reintroduced to the basics of ECG. Critical care patient care topics have included stress ulcer prophylaxis, deep vein thrombosis prophylaxis, analgesia, sedation, and neuromuscular blockade in the critically ill patient.

Since it has been our experience that the majority of our students interested in pursuing postgraduate residency training choose this elective course, we also discuss postgraduate training and various career opportunities within pharmacy practice. When possible, pharmacists with diverse career backgrounds, current or past pharmacy residents, or other healthcare professionals have been invited to speak about their experiences and answer student questions.

The students formed small groups of 4 to 6 students. These groups were used to facilitate ACLS instruction and certification. The ACLS portion of the elective was covered over 5 class periods; 3 that reviewed the phar-

macology and application of both medication and non-medication interventions (15 contact hours), and 2 weeks during which student knowledge was tested on paper and in real-life cardiac arrest scenarios (5 contact hours). Using an interactive lecture format, the ACLS Instructor, a registered nurse, provided mnemonics and a stepwise thought process to optimize student learning and retention of material. Written examinations were proctored to meet the expectations of the AHA. During the hands-on cardiac arrest scenarios, each member of the group rotated through 1 of 4 roles; airway management, defibrillation/cardioversion, transcription, and code team leader. Scenarios were presented by certified ACLS instructors who supplied the students with an intimate understanding of ACLS protocols, reinforced the material presented to them in the classroom, and guided the student groups through each scenario.

The student groups formed during the first week of class were required to present and critique a cardiac arrest scenario during the last 3 class meetings (6 contact hours). The scenarios could be from a variety of sources, including a prerecorded or live role-playing group scenario. After presenting the scenario to the class, the group members were responsible for analyzing the individual steps taken during the scenario, identifying errors or omissions, and correct the cardiac arrest scenario to reflect an appropriate sequence of events. After all of the groups had completed their 20-minute presentations and written a summary of their scenario, fellow students were asked to vote for the group with the best presentation. The winning group was then awarded a prize at the end of the course. In past years, prizes have consisted of various cardiovascular, critical care, or general reference texts and tools such as stethoscopes and ECG calipers.

Student evaluations of the course were completed at the final meeting. For the course evaluations, the students were asked to answer several predefined questions as established by the University. These questions pertained to the quality of the course and the preparation of the faculty members involved in the course. The students used a 5-point Likert scale to express their levels of satisfaction. After completing the first part of the evaluations, the students were encouraged to provide written comments specific to this course. Evaluations were completed anonymously without the course coordinator's presence and returned to the course coordinator through college staff. The staff typed the handwritten comments to assure the evaluations remained anonymous.

In April 2003, we conducted a telephone survey to determine whether other colleges of pharmacy offer ACLS instruction to their pharmacy students as part of their curriculum. All 86 colleges of pharmacy listed on

the AACP website were contacted by telephone. All were asked if a course, required or elective, was offered to the students that specifically provided them with the opportunity to become ACLS certified.

## RESULTS

Approximately half of CPG students chose to enroll in this elective course. Four years after this course was first offered, 176 out of 178 (98.9%) students have successfully completed the course and have become certified ACLS providers. Results from the predefined questions indicated a high level of satisfaction with the preparation, delivery, and quality of the course. Students provided numerous positive comments and, unanimously, expressed a high level of satisfaction with this class. The most common themes in their written comments pertained to the volume of information that they learned during the course and reinforcement of the material learned in their required courses. The following are some of the student comments we received:

- “Great course. Should be required!”
- “I am indeed surprised at what I have learned.”
- “The ACLS workshop was the best. It finally allowed me to understand some cardiac issues that I had not understood during normal class time.”
- “This class was tiring and time consuming, but worth every minute!”
- “ACLS was an excellent elective. It has reinforced a lot of important facts.”
- “This is one of the most challenging and exciting classes ever. It makes you think under pressure and as a result you retain the skills/knowledge.”
- “ACLS provides me much of the hands on training that solidifies my previous learning.”
- “Thank you for taking the time to provide me with the tools I need to become a better pharmacist.”
- “I hope that you continue to offer this course. Not only did it give me ACLS certification, but it also helped hammer home some points on medications for the heart.”
- “The hours were long, but the experience was worth it. I would highly recommend this class to anyone who wants to go above and beyond the traditional idea of a pharmacist.”
- “. . .the class was fun, informative: I'll remember and use the material!!”

The extensive contact hours required to complete this elective course may seem intimidating to students, yet completion demonstrated a level of dedication that students can be extremely proud of. Of the 86 colleges of pharmacy surveyed, we only found one that offered an elective to third year pharmacy students that culminated in ACLS certification.

## DISCUSSION

Even though it is unlikely that a pharmacist would be called upon to “lead” an ACLS code, it is a common practice in some institutions for pharmacists to participate as a code team member. Pharmacists may be asked to make recommendations and manipulate or prepare medications for the practitioners conducting the code. Providing ACLS instruction to pharmacy students is intended to familiarize them with the medications and procedures used in a cardiac arrest situation. Pharmacists involved in code scenarios are at a greater advantage if they are capable of following the ACLS algorithm and if they are able to be actively involved with the required interventions.

There is very little information published on the education of pharmacy students within the realm of critical care. One other college of pharmacy was found in our telephone survey to routinely offer an elective providing ACLS certification to third year pharmacy students. Another university used critical care pharmacy residents to perform 4 cardiac arrest scenarios for the purpose of exposing pharmacy students to these scenarios prior to practical experiences. The students were then split into small groups and asked to participate in the cardiac arrest scenarios on the following day.<sup>3</sup> This exercise did not offer ACLS certification to the pharmacy students.

MWU-CPG was 1 of only 2 colleges of pharmacy in the United States found to offer ACLS certification on campus in an elective course as part of the curriculum.

## CONCLUSIONS

As the role for health-system pharmacists continues to expand, we believe that critical care and ACLS instruction are areas of practice that students need greater exposure to during their curriculum. Innovative teaching methods allow students a desirable medium for acquiring and demonstrating new knowledge. MWU-CPG provides students a desirable opportunity to refresh and apply ACLS skills prior to beginning their practical training experiences.

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