Cultivating Clinical Experience: Effectiveness of Blended Learning in Pharmacy Education

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ABSTRACT

The scope of health professions is widening at an exponential rate. As such, training in these fields must adapt quickly. Pharmacy is one of the fields in the healthcare sector that needs to change to meet the needs of the industry. Currently, pharmacy schools utilize Introductory Pharmacy Practice Experiences (IPPEs) and Advanced Pharmacy Practice Experiences (APPEs) to teach clinical skills to their students. Schools also utilize simulations and offer elective post-graduate residencies to give their students more hands-on experience. Simulations are becoming more prevalent in the field of education. Whether they are physical or virtual simulations, studies have shown that they are equally beneficial to students. Furthermore, a blended learning model of combining simulations with other modes of learning has shown to be more effective than utilizing simulations alone. Due to the expanding scope of the pharmacy profession, residencies are expanding in time and content. Some educators suggest that residencies should be extended from two years to three years to teach leadership skills, while others believe APPEs should have more rigid accreditation criteria. There has been some research done as to which methods of teaching allow students to learn most effectively. This paper explores such findings.

Keywords: Medical education, Pharmacy education, Pharmacy practice, Simulation, Blended learning

Introduction

The scope of the pharmacy profession is expanding. Pharmacists are administering more vaccinations and patient consultations than in previous decades. More educational institutions are being built to meet the program demand. In addition, there are a growing number of specialties in which pharmacists can be trained. This requires a coordinated, standardized training effort across the profession. Such effort is currently nonexistent. At present, Introductory Pharmacy Practice Experiences (IPPEs) and Advanced Pharmacy Practice Experiences (APPEs) are the only widespread modes of gaining clinical experience; however, a lack of rigid accreditation standards leaves much discretion to the school. IPPEs and APPEs are the only on-site training pharmacists are required to complete before being granted a PharmD degree. This paper will outline the following: (1) significant financial barriers still exist in obtaining effective simulated trainings; (2) complementary training methods should be administered in concert through a blended learning model

to increase their individual effectiveness; (3) modification of the traditional structure of the APPE model can be beneficial; (4) the traditional post-graduate residency training model is experiencing inefficiencies that must be remedied.

Simulation-based Training

Simulations are a cheap, effective way to give students hands-on experience at an early stage in their pharmacy education. There are many types of simulations: high-fidelity patient models, standardized patients, virtual reality, and full environment simulations (1). Research has shown that no matter what kind of situation is used, students' learning is aided with the use of simulation. ACPE recognizes simulations as a method of teaching critical thinking and problem-solving skills (2). There have been publications speculating that IPPEs may be replaced by simulations since many things learned in IPPEs can be learned through simulations. Simulations are a way to replicate real scenarios that students encounter in a clinical setting for the preparation of their careers.

Pharmacy school faculty have a rigorous technical curriculum to deliver to their students. The specific skills may cause one type of simulation to be more effective and appropriate compared to another. For instance, if an instructor is trying to teach students how to measure blood pressure, the instructors should use a "programmable computerized patient simulator" (3) rather than a human subject. This is because blood pressure changes constantly; therefore, it is hard for the instructor to verify if the student's reading is correct if a live patient is involved.

Another instance where simulation is used is in pediatric cases. Human patient simulators are people acting to be like other healthcare professionals, patients, or patient's family members. The University of Alabama at Birmingham uses human patient simulations to teach their students how to professionally interact in a clinical setting. They created a room devoted to housing the simulation. An instructor said that "we

observed the pharmacy students interact in a genuine, caring, and professional ways" (4). There are many uses for simulators in pharmacy education.

Regardless of the advances in simulation technologies, nothing can entirely replace the real environment. Advantages to training with simulations include no risk to live patients, no preceptor necessary, and the ability to repetitively practice. Disadvantages include the fact that a simulation is not a real scenario, human emotions and personalities are absent, and costs are high (1). An important observation is that sometimes the effectiveness of a simulation increases when group discussions and lectures complement the simulation simultaneously (5). It is important that the appropriate simulation is selected, advantages and disadvantages are considered, and if possible, lecture content coincides with the simulation.

Clinical Rotations

In addition to simulation-based training, IPPEs and APPEs are another tool that schools use to make sure their students are prepared for their future careers. Typically, schools have their students complete 8-five-week rotations to satisfy the APPE requirements set by ACPE. Young and a team of pharmacists conducted a study on what students thought comprised an excellent preceptor. The study had students complete a fourteen-item evaluation on their preceptor. They concluded that "ACPE provides minimal oversight on how preceptors should be evaluated by students" (6). Because of the lack of criteria, the pharmacy school is left with much discretion regarding what their APPEs contain and how to improve them. Lastly, Young and his team found that students preferred preceptors with skills in "serving as a role model, showing an interest in teaching, and relating to the student as an individual" (6). Students were not concerned with the pharmacist's certification, degree, or years of experience.

Some pharmacy schools are taking the initiative to improve their APPEs even though

they are not required to by ACPE. Hatton and Weitzel published an article on how converting the traditional 8-five-week rotation APPE model to a block schedule system affected their student's learning at the University of Florida College of Pharmacy (UFCOP). First, they tried to formulate what an ideal APPE model would look like: "[it] would provide students with many opportunities for learning, incentivize preceptors and institutions, and ensure high-quality educational experiences" (7). The authors concluded that the block schedule decreased logistical arrangements of traveling to multiple rotation sites, allowed more time for students to develop skills, and formed more relationships with students and staff. Students were able to help each other through the rotation, provide clinical and discharge counseling, and learn more specific concepts. Patient satisfaction increased and the hospital became recognized both regionally and nationally for the projects the students worked on.

There are noted disadvantages to the previously suggested block schedule system: students only get to experience one institution, technology is hard to provide to that many students while on rounds, and near the end of the APPE, students get comfortable and essentially become free labor to the institution (7). Another way to improve APPEs was discussed at the end of Young's article. He suggested that preceptors should be required to complete "training on how to serve as a role model, make time for students, and provide good direction and feedback" (6). The block schedule and preceptor training are only a couple of ways to improve the APPEs.

A pharmacy school in Vancouver tested an APPE model that placed students in a long-term care (LTC) facility where their preceptor was off-site. Usually, the doctors and pharmacists that work at LTC facilities rotate between multiple LTC sites. The rotation put a student at one LTC facility and the preceptor rotated between sites. This approach is called "role-emergent" compared to the "role-established" model. The study showed that the LTC staff "felt that they delivered better

care to residents as a result of the services provided by the students" (8). Preceptors also said they learned new skills from the students. As a result of the role-emergent model for APPEs, students, preceptors, site staff, and patients were benefited. The authors hope these findings will cause LTC facilities to be viewed as rotation sites that offer "legitimate institutional-based learning experiences" (8).

Post-graduate Training

Upon completion of pharmacy school, graduates can elect to do a residency. This is a way to gain specialized clinical experience. Residencies are typically two years. Currently there are not many residency positions available, despite the high demand (9,10). In addition to the few positions open, lack of funding, and the fact that these opportunities are not presented to students until their third or fourth year of pharmacy school, are other reasons why students forgo residencies (9, 10). Scholars weigh many options like costs, returns, and value when deciding to pursue post-graduate training (11). Many think that a residency is a prerequisite for a pharmacy job in a hospital, which is not the case (9).

Lack of funding and lack of residency programs are the biggest issues with pharmacy training today. Johnson and Teeters did research on the current state of pharmacy schools with regards to quality. They identified areas that needed improvement, and how these improvements should be implemented. They explained the pharmacy's current state as, "similar to the [problems] the medical profession navigated through fifty years ago" (12). There are a few ways to combat these issues. Johnson suggests a way to increase funding is to document what takes place during a residency and how patient satisfaction increases.

Clark and Johnson (10, 12) have some ideas on how to improve the current residency model too. Clark thinks that adding another year, PGY3, will allow graduates to learn how to succeed in a leadership role within a hospital. Pharmacists are becoming integrated with other hospital staff such as doctors,

nurses, and lab personnel. Johnson believes that having the current post-graduates teach the incoming post-graduates will allow a more efficient flow of graduates in and out of residency. This way the pharmacy director of the institution will not have to train so many students and this will allow more residency opportunities. Perhaps a quicker way of opening residency positions is to create non-hospital residencies, such as community pharmacy residencies.

Discussion

Training is essential in any industry because its success or failure directly affect the sustainability of the business. Pharmacist training begins in school and continues through residencies. Training has been successful when multiple methods of learning are administered in synergy. This blended learning model could manifest via combining a simulation and a lecture instead of only conducting a simulation. This way, students will have the opportunity to see the real-world application of their learnings and understand the reasoning behind what they are physically doing.

ACPE needs to create more specific standards as to the contents of APPEs. Also, preceptors should be trained on how to make time for their students and how to provide actionable feedback. An easy way of balancing time is to delegate some teaching items to senior students to teach the more junior students. If students do not have access to post-graduate training, APPEs are the only role-emergent clinical training that they receive. Because of this, it is vital that APPEs become more robust.

Residencies need to be more accessible. A lack of funding is typically cited as the rationale for why they are not. Residency directors should document how patient safety and satisfaction increase because of a residency. Such documentation can be presented to institutional leadership or submitted on grant applications to champion for more funding. To further address the lack of availability, the federal government could mandate that public health institutions, with a pharmacy staff of more than a certain number of employees, split one full-time position into a part-time residency and a part-time employee. This would be a small task that could drastically create residency opportunities for pharmacy students.

Learning clinical techniques is a major part of what pharmacy school teaches. Simulations, IPPEs and APPEs, and residencies are ways for students to cultivate and hone their clinical expertise. Small changes to the existing educational system could have a massive impact in producing competent, professional, and adaptive pharmacy leaders. Modification of pharmacy training is not a one-time exercise. It must be continually revisited to ensure it is meeting the objective of preparing pharmacists to excel in a highly dynamic field while meeting the needs of the patients they serve.

Conflict of Interest

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