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Research Note

Ten year experience with student pharmacist research within a health system and education center

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ABSTRACT

Introduction: Skills gained from research experience allow student pharmacists to evolve as practitioners, innovators and perpetual learners in an increasingly complex healthcare environment. Data published regarding pharmacy resident research are focused on external dissemination rates and research programs. Little is published regarding student research.

Methods: This descriptive study was a five-year before and after comparison between the existing co-curricular model and a new longitudinal, 12-month research advanced pharmacy practice experience (L-APPE) model for student pharmacist research. The objective was to describe the development and transition to the L-APPE and compare the models in external dissemination rates and preceptor-classified impact on patient care. Preceptors were surveyed to characterize the impact on the health care institution.

Results: Over a ten-year period, 65 fourth year students engaged in research. From 2006–2011, 28 students (43.4% of student cohort) completed co-curricular research projects. From 2011–2016, 37 students (40.2% of student cohort) completed the L-APPE. The number of national poster presentations increased 6-fold with the L-APPE, from 6 (21.4%) to 36 (97.3%) ($p < 0.01$). Combined posters and peer reviewed publications had a 350% higher occurrence (RR 4.5, 95% CI 1.9–10.9; $p < 0.01$). Preceptors classified L-APPE projects 1.5 times more often as leading to a change or affirmation of a practice model or prescribing pattern (83.3% vs 57.1%; $p = 0.03$).

Discussion and conclusions: The L-APPE research model increased external dissemination rates and resulted in more meaningful practice model or prescribing pattern benefits. Additional study of pharmacy student research is warranted.

Introduction

Research experience has become essential for preparing pharmacy students for practice in the increasingly complex health care environment. Direct engagement in research allows students to understand the research process and to develop advanced and systematic problem-solving skills. The cognitive skills gained allow students to evolve as practitioners, leaders, innovators, and perpetual learners, regardless of the future practice setting.^{1,2} The Accreditation Council for Pharmacy Education (ACPE) encourages elective courses and advanced pharmacy practice experiences (APPEs) that engage students in research, and the American College of Clinical Pharmacy (ACCP) encourages an expansion in student involvement in hands-on research.^{1,3,4} Basics of study design and

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biostatistics are required in pharmacy school curricula, but application of research skills in the experiential setting using real-world questions is offered less often. One systematic review identified only 10 reports (7% of US pharmacy programs) in which students were engaged in the entire research process from development of the proposal, collecting and analyzing data and preparing a written report or presenting the findings.⁵ Most research experiences offered to students are campus-based and not partnered with an academic or community health system. Up-front training time, preceptors and funding required for clinical research within an institution are recognized as barriers to research.⁶ In a 2006 survey of 79 schools of pharmacy, 25% of programs required research, and 57% offered an elective. Of all programs that offered research, only 15% required students to complete the project.⁷ Surprisingly, these results did not differ substantially from the same survey in 1997.⁸ A survey in 2008 had similar results, with 32% of schools requiring the design of a project but only 13% requiring full project completion in the experiential setting.⁹

The impact of student research on the school of pharmacy, the student, and the institution should be evaluated. Conceivably, the impact on schools of pharmacy is an increase in scholarly output, and several schools have published data on increased state, national, or international presentations and publication rates when research is required or offered.^{6,10-12} The value of research is diminished when the findings are not disseminated to the scientific community.

Benefits to pharmacy and medical students have been primarily guided by student surveys.^{13,14} Little has been published on benefits to patient care or changes in practice patterns within the institution. With pharmacy residents, most data have focused on publication rates, perceived research abilities, research programs, and not on patient care impact.¹⁵⁻²¹ In two studies, student and preceptor perceptions were that the research was valuable to the institution or could be used to benefit the facility, but specific value was not assessed.^{10,22} Beyond those studies, little has been published that classifies the impact or benefit within health systems attributed to or contributed by student pharmacist-conducted research.

Methods

Our primary aim was to evaluate 10 years of student pharmacist research. We compared two experiential models in the extent of external dissemination at national meetings or peer reviewed journal publications and in preceptors' classifications of impact within a community health system and education center.

Setting

Mission Hospital is a 730-bed tertiary care community hospital in Asheville, North Carolina that serves as the hub of a six-hospital system in an 18-county region of Western North Carolina. Mission Hospital is the region's only independent community hospital and has over 40,000 discharges per year. The hospital has had a contractual partnership with the University of North Carolina (UNC) Eshelman School of Pharmacy for over 20 years that has included the provision of pharmacy practice experiences along with share funding of practice-based faculty. The Mountain Area Health Education Center (MAHEC) is a large, interdisciplinary teaching clinic that also has a similar partnership with UNC Eshelman School of Pharmacy. MAHEC has eight primary care clinics that provide integrated, team-based primary care for over 15,000 patients. These partnerships form a collaborative triad in Western North Carolina whose goal is to provide care, improve the health of patients and train the next generation of practitioners.

Mission Hospital and MAHEC provide pharmacy practice experiences through the utilization of both share funded faculty and volunteer preceptors. Cohorts of fourth year students (PY4s) had been based in Asheville for most of their experiential training, and the volume of PY4 students expanded in 2014 with the opening of the school's four-year satellite campus in Asheville in 2011.

Third year student pharmacists (PY3s) with UNC Eshelman School of Pharmacy are asked to rank their preferences for a specific regional assignment that serves as a hub location for their PY4 APPEs. Each PY3 student is also asked to rank their preferences for required and elective APPEs and state his/her interest in engaging in research with a faculty member or preceptor. During the study, those students who met a minimum grade point requirement were eligible to engage in research, but this requirement has since been eliminated. For UNC, cohorts of 10-15 PY4 students had been based in the region for APPEs which expanded to 20-25 students in 2014 as a result of the satellite campus. Over the last 10 years, one to as many as 10 students per year (range 9-57% of the regional cohort) have engaged in research as a PY4.

Implementation and design

An elective experiential research experience was first developed in 2003 in parallel with the school's implementation of the pre-residency track, later called the Clinical Scholar's Program (CSP). All PY4 students enrolled in this track were required to complete a research project and were automatically assigned an elective research APPE. Students worked on individual projects mentored by a faculty member or preceptor selected by the student. No pharmacy practice experience time was devoted to project completion; therefore, it was considered co-curricular. Students were expected to take primary responsibility for the project design, submission to the institutional review board (IRB), data collection and analysis, project completion as well as abstract and poster presentation (if applicable). All students were offered support for more advanced statistical analysis by a biostatistician with the Mission Hospital Research Institute (RI). Prior to beginning the research project, the only preparatory course work was a drug literature evaluation course fall semester of the second year that included basic biostatistics and study design. Students were not formally evaluated or graded, and CSP students were required to present either a poster or platform at a state pharmacist association meeting. Presentation at a national meeting was mentioned but not emphasized. The requirement of a state meeting presentation assisted with some accountability, but the lack of formal evaluation limited accountability for project completion. Experience gained led us to recognize

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