BRIEF

The Impact of an Early Clinical Experience on Pharmacy Student Learning About Ambulatory Care Practice

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Objective. To determine whether student confidence in their knowledge of ambulatory care pharmacy and ability to contribute to patient care in this setting increased after participating in an ambulatory care introductory pharmacy practice experience (IPPE), and whether it changed student interest in pursuing a career in ambulatory care pharmacy.

Methods. Second-year pharmacy students (n=86) completed a required ambulatory care experience which included four hours of didactic work and 13.5 hours of clinic experience with an ambulatory care pharmacist. Before and after the experience, students completed an eight-question survey in which they rated their confidence in their knowledge of ambulatory care practice and in providing patient care in this setting, as well as their interest in a career in ambulatory care. A five-point Likert scale was used to assess student confidence (1=not at all confident, 5=very confident) and interest in ambulatory care (1=not at all interested, 5=extremely interested). The Wilcoxon signed rank test was used to compare pre-post survey responses.

Results. Eighty-five pharmacy students completed both the pre- and post-survey. Median scores on the post-intervention test increased from 3 to 4 in seven of the domains assessed. Student interest in a career in ambulatory care remained unchanged.

Conclusion. An ambulatory care IPPE increased student confidence in their understanding of ambulatory care pharmacy practice and caring for patients in this setting.

Keywords: introductory pharmacy practice experience, experiential education, ambulatory care

INTRODUCTION

The Accreditation Council for Pharmacy Education (ACPE) requires Doctor of Pharmacy (PharmD) curricula to include a minimum of 300 hours of introductory pharmacy practice experiences (IPPEs) and a minimum of 1440 hours of advanced pharmacy practice experiences (APPEs).[1] One hundred fifty hours of IPPE must be balanced between community and institutional health-system settings. Pharmacy students must complete APPE hours in four required settings, including community pharmacy, ambulatory patient care, health-system/hospital pharmacy, and inpatient general medicine. The remaining APPE hours are completed in elective settings. Prior to 2018, the IPPEs completed by students at the University of Michigan College of Pharmacy included community (104 hours) and hospital (104 hours) IPPEs,

and a predominately inpatient-focused direct patient care experience (52 hours). Forty-seven of the IPPE hours were completed through various other professional practice activities, including shadow experiences and community health events.[2] Given the rapid expansion of ambulatory care pharmacy practice, the college partnered with 17 pharmacist preceptors (five faculty and 12 adjunct faculty) in their ambulatory care clinics in both primary care and specialty settings at our affiliated health system to create an ambulatory care IPPE. Impetus for developing an ambulatory care experience included feedback from graduating students collected through exit interviews, college-wide town hall meetings, and focus groups with second- and third-year students indicating interest in having earlier exposure to ambulatory care.

The effectiveness of innovative IPPEs in increasing student confidence in their knowledge of clinical pharmacist roles and their ability to contribute to patient care has been demonstrated in previous studies.[3,4] Mort and colleagues showed that pharmacy students' exposure to clinical communication, pharmacy practice, and use of

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reference materials through an IPPE led to improved APPE performance.[4] Hardy and Marshall described an innovative three-semester course that was created to emulate an APPE and provide pharmacy students with an opportunity to practice clinical skills within the classroom. Student confidence increased from somewhat confident to confident or very confident following exposure to a virtual health system in a didactic environment.[5] Dettra and colleagues investigated the impact of a three credit-hour didactic elective on pharmacy students' understanding of and interest in ambulatory care pharmacy practice compared to that of those not enrolled in the elective. Students enrolled in the elective demonstrated improved understanding of the role of ambulatory care pharmacists; however, this did not translate into an increased intention to pursue a career in ambulatory care.[6] The purpose of this study was to assess the change in student confidence in their knowledge of ambulatory care pharmacy practice, confidence in their ability to contribute to patient care in this setting, and interest in pursuing a career in ambulatory care following completion of an ambulatory care IPPE.

METHODS

Between September 2018 and April 2019, all second-year students at the college were required to complete a semester-long ambulatory care IPPE. Building upon the types of experiences described above, we created an ambulatory care experience that uniquely included 4.0 hours of didactic work, 13.5 hours of clinic experience (three 4.5-hour clinic sessions with an ambulatory care pharmacist), and 2.0 hours of interprofessional discussion. Preceptors oversaw a minimum of one and maximum of six IPPE students per semester. A 1:1 ratio of preceptor to student was maintained for second year (P2) students completing the ambulatory care IPPE; however, preceptors often supervised fourth year (P4) APPE students and pharmacy residents concurrently. Prior to spending time with an ambulatory care pharmacist, students participated in classroom activities to learn more about ambulatory care pharmacy and the electronic medical record. After spending time in clinic with ambulatory care pharmacists, students participated in group discussions and completed a reflection based on their experience, including an interprofessional discussion about health care team member roles with students from our medical school

After completing the IPPE, students were expected to be able to: navigate the medical record, demonstrating knowledge of where to obtain pertinent patient information in the ambulatory care setting; apply components of the Pharmacists' Patient Care Process to the ambulatory

care environment; and explain the role of the pharmacist and other members of an interprofessional team. Preceptors rated students' achievement of the learning outcomes as satisfactory or unsatisfactory using a standard evaluation form. The IPPE provided introductory level exposure to the Interprofessional Education Collaborative competencies.[7]

Prior to starting the clinic experience, students completed online electronic medical record training and received didactic instruction focused on working up an ambulatory care patient and presenting the case to a preceptor. An introduction to ambulatory care visits was also provided to assist students in understanding what to expect during their time in the clinic. Following completion of the clinic experience, all students presented a patient case from their clinic experience during a discussion session led by an ambulatory care preceptor. Active discussion was facilitated by the preceptor around each case presentation to allow students to compare and contrast their experiences with those of their peers who may have been assigned to a different type of ambulatory care clinic. The IPPE concluded with an interprofessional case experience focused on medication history taking that allowed pharmacy students to partner with and learn from students from the school of medicine. They were placed in groups (one pharmacy and two medical students) and role-played taking a medication history. After each profession interviewed the patient, small-group and full-class discussion sessions were held that focused on the differences in interview techniques between the disciplines and what students learned from the other discipline. Evaluations of the IPPE and preceptor were completed by all students at the conclusion of the experience.

Before and after their clinic experience, pharmacy students completed an eight-question survey to assess their confidence in knowledge of ambulatory care practice and skills applicable to patient care as well as their interest in a career in ambulatory care. The survey instrument was adapted from that used by Smith and colleagues.[3] Survey items included: role of the ambulatory care pharmacist on the care team, role of the ambulatory care pharmacist in caring for patients, ability to know where to obtain information in the electronic health record to help care for patients, ability to find literature to help contribute to the care of patients in the ambulatory care setting, knowledge of the role of patient counseling in the ambulatory care setting, knowledge of the role of motivational interviewing in the ambulatory care setting, and knowledge of how to apply the Pharmacists' Patient Care Process in the ambulatory care setting. A five-point Likert scale ranging from 1=not at all confident to 5=very confident was used to assess student confidence

in each of these areas. The final survey question assessed students' level of interest in ambulatory care pharmacy practice (1=not at all interested to 5=extremely interested). Pre- and post-survey results were analyzed using the Wilcoxon signed rank test. The study was reviewed by the university's Institutional Review Board and deemed as not regulated.

RESULTS

Eighty-six second-year pharmacy students completed the ambulatory care IPPE during the 2018-2019 academic year; 86 completed the pre-IPPE survey and 85 completed the post-IPPE survey. All students achieved the learning outcomes and were rated satisfactory by preceptors on all evaluation criteria; all students passed the course.

Most students (62%) indicated that they completed four or more patient assessments per week as part of their clinic experience. Fifty-eight percent of students completed their clinic experience at a patient-centered medical home (PCMH) site, while the rest spent time at a site specializing in oncology, psychiatry, anticoagulation, or transitions of care (TOC), or at a multispecialty practice site. Seventy-six percent of students rotated through a site that used both clinic and phone visits (Table 1).

The median baseline score (ie, response) on seven of eight of the assessment questions was 3, ie, somewhat confident. There was a significant ($p<.001$) increase in scores for all questions pertaining to student confidence in their knowledge of ambulatory care pharmacy and their ability to contribute to patient care in the ambulatory care setting. Student interest in pursuing a career in ambulatory care did not change after exposure to the ambulatory care IPPE (Table 2). Given that some students completed the ambulatory care IPPE at clinic sites that only conduct phone visits, a post-hoc analysis of survey results was conducted in which students' survey responses were

Table 1. Clinical Assignments of Pharmacy Students Completing an Introductory Pharmacy Practice Experience in Ambulatory Care

Ambulatory Care IPPE Site	Students, No. (%)[a]
Patient centered medical home	50 (58.1)
Oncology clinic	13 (15.1)
Oncology oral chemotherapy service[b]	7 (8.1)
Psychiatry clinic[b]	6 (7.0)
Transitions of Care[b]	5 (5.8)
Multispecialty clinic	3 (3.5)
Anticoagulation[b]	2 (2.3)

[a]Total off by 0.1% due to rounding
[b]Site completes phone visits only

compared by type of clinic encounter completed. Students' pre-post survey responses remained statistically significant (p < 0.05) for all survey questions with the exception of the role of motivational interviewing in the ambulatory care setting when survey responses were compared by type of encounter completed (Table 3).

Student evaluations of preceptors were also assessed as part of the experience. Ninety-five percent of students strongly agreed or agreed that the preceptor helped them increase their understanding of ambulatory care practice and improve their skills. Ninety-one percent of students strongly agreed or agreed that their preceptor encouraged their self-directed learning and helped them to develop problem-solving skills in the ambulatory care environment. Ninety-seven percent of students strongly agreed or agreed that their preceptor was an enthusiastic and dedicated teacher. All students strongly agreed or agreed that their ambulatory care preceptor was a knowledgeable and respected professional.

All students provided written comments in the post-survey that aligned with common themes, including an overwhelming appreciation for pharmacist interactions with patients in ambulatory care and a better understanding of chronic disease management. Students enjoyed the layered learning model, ie, having fourth-year students on rotation in the same clinic at the same time with them, reporting that this gave them exposure to what their APPEs would look like. Finally, students appreciated being exposed to ambulatory care as many had never experienced this area of pharmacy. With regard to areas of improvement, the most common theme was the need for more time and the desire to see other areas of ambulatory care during the experience.

DISCUSSION

Introductory pharmacy practice experiences are designed to expose students to pharmacy practice in different settings (commonly, inpatient and community practice), providing students with introductory experiences before they start their APPEs. The structure of IPPEs varies greatly between pharmacy schools, and school and preceptor expectations for students may also vary depending on the type of rotation site.

Our team created a required ambulatory care IPPE that encompasses didactic, experiential, and interprofessional components. We studied the impact that the ambulatory care IPPE had on student confidence in their knowledge of ambulatory care pharmacy practice, their ability to contribute to patient care in ambulatory care settings, and their interest in pursuing a career in ambulatory care. Even with a relatively short time in clinic,

Table 2. Changes in Pharmacy Student Confidence After Completing an Introductory Pharmacy Practice Experience in Ambulatory Care Pharmacy (N=85)

Student Confidence in Their:	Median	p value[a]	1 Not at all Confident N (%)	2 Marginally Confident N (%)	3 Somewhat Confident N (%)	4 Confident N (%)	5 Very Confident N (%)
Ability to describe the role of the ambulatory care pharmacist on the ambulatory care team							
Pre	3	<.001	4(4.7)	18 (21.2)	45 (52.9)	16 (18.8)	2 (2.4)
Post	4		0	3 (3.5)	7 (8.2)	43 (50.6)	32 (37.6)
Ability to describe the role of the ambulatory care pharmacist in caring for patients							
Pre	3	<.001	3 (3.5)	19 (22.4)	36 (42.4)	23 (27.1)	4 (4.7)
Post	4		0	2 (2.4)	10 (11.8)	39 (45.9)	34 (40.0)
Ability to know where to obtain information in electronic health record to help care for patients							
Pre	3	<.001	5 (5.9)	20 (23.5)	31 (36.5)	22 (25.9)	7 (8.2)
Post	4		1 (1.2)	1 (1.2)	16 (18.8)	39 (45.9)	28 (32.9)
Ability to find literature to help contribute to the care of patients in the ambulatory care setting							
Pre	3	<.001	8 (9.4)	17 (20.0)	32 (37.6)	23 (27.1)	5 (5.9)
Post	4		1 (1.2)	6 (7.1)	19 (22.4)	36 (42.4)	23 (27.1)
Knowledge of the role of patient counseling in the ambulatory care setting							
Pre	3	<.001	5 (5.9)	12 (14.1)	36 (42.4)	27 (31.8)	5 (5.9)
Post	4		0	4 (4.7)	6 (7.1)	41 (48.2)	34 (40.0)
Knowledge of the role of motivational interviewing in the ambulatory care setting							
Pre	3	<.001	3 (3.5)	11 (12.9)	33 (38.8)	33 (38.8)	5 (5.9)
Post	4		0	8 (9.4)	11 (12.9)	33 (38.8)	33 (38.8)
Knowledge of how to apply the Pharmacist's Patient Care Process in the ambulatory care setting							
Pre	3	<.001	6 (7.1)	19 (22.4)	38 (44.7)	19 (22.4)	3 (3.5)
Post	4		1 (1.2)	9 (10.6)	9 (10.6)	42 (49.4)	24 (28.2)

	Median	p value[a]	1 Not at all Interested N (%)	2 Marginally Interested N (%)	3 Moderately Interested N (%)	4 Interested N (%)	5 Extremely Interested N (%)	Unsure N (%)
Current level of interest in a career in ambulatory care pharmacy								
Pre	4	0.72	3 (3.5)	3 (3.5)	17 (20.0)	39 (45.9)	20 (23.5)	3 (3.6)
Post	4		1 (1.2)	8 (9.4)	14 (16.5)	32 (37.6)	29 (34.1)	1 (1.2)

[a]Wilcoxon signed rank test
[b]Some rows may not total exactly 100% due to rounding

Table 3. Pre-Post Comparison of Pharmacy Students' Survey Responses by Type of Clinic Encounters Completed While on an Introductory Pharmacy Practice Experience in Ambulatory Care Pharmacy[a]

Area of Student Confidence	Phone-Based Only, *p* value[b]	Phone and Clinic Visits, *p* value[b]
Ability to describe the role of the ambulatory care pharmacist on the ambulatory care team	.007	<.001
Ability to describe the role of the ambulatory care pharmacist in caring for patients	.03	<.001
Ability to know where to obtain information in electronic health record to help care for patients	.04	<.001
Ability to find literature to help contribute to the care of patients in the ambulatory care setting	.006	<.001
Knowledge of the role of patient counseling in the ambulatory care setting	.001	<.001
Knowledge of the role of motivational interviewing in the ambulatory care setting	.41	<.001
Knowledge of how to apply the Pharmacist's Patient Care Process in the ambulatory care setting	.03	<.001
Current level of interest in a career in ambulatory care pharmacy	.76	.50

[a]Clinical encounters were either phone-based only vs phone and clinic visits
[b]Determined using the Wilcoxon signed rank test

survey results demonstrated a significant increase in students' confidence scores. The majority of students were involved in the assessment of four or more patients per week in the ambulatory care setting, which reinforced the didactic components of the PharmD curriculum they had already completed and provided students with valuable clinical experience prior to beginning their fourth-year ambulatory care APPE. The nonsignificant difference seen in students' post-survey interest in pursuing a career in ambulatory care was likely because of students' already strong interest in this area as indicated by baseline scores. Interestingly, although our experience was designed differently than that of Detra and colleagues[6] in that we included immersion time in clinic in addition to didactic content, we saw similar results. Student understanding of the role of ambulatory care pharmacists increased in both studies, while no difference was seen in the percentage of students intending to pursue a career in ambulatory care. Additionally, our study exposed all second-year students to direct patient care within ambulatory practice, while other published studies describe students completing elective courses or ambulatory care experiences based on their preference or on random assignments.[3,6]

Our study had a few limitations, including the small sample size, which consisted of our first class of students who completed the experience. In addition, our students completed their ambulatory care IPPE in several different types of clinics, some of which were in less traditional ambulatory care settings. However, we believe this diversity of practice settings aligns with real-world ambulatory care practice and students consistently provided positive feedback on their experience and preceptors.

Future studies should evaluate any association between the number of hours spent in ambulatory care clinic settings during IPPE and student learning, and whether there are differences as more care in the ambulatory setting shifts to telehealth. Additionally, the impact of completing an ambulatory care IPPE on ambulatory care APPE performance should be investigated.

CONCLUSION

Implementation of an ambulatory care IPPE significantly increased student confidence in their knowledge of ambulatory care pharmacy and confidence in their ability to contribute to patient care in the ambulatory care setting. While this experience did not have a significant impact on student interest in ambulatory care as a career option, baseline interest in pursuing a career in ambulatory care was high.

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