Research Report

Emergency Medicine Physician Residents' Perceptions of Emergency Medicine Clinical Pharmacists' Involvement in Their Training

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Abstract

Background: Although the clinical impact of emergency medicine clinical pharmacists (EMCPs) on patient care outcomes is well documented, their educational impact on resident physicians' training is not. **Objective:** To further highlight the utility of EMCPs, this study evaluated emergency medicine (EM) resident physicians' perceptions of EMCPs' involvement in their training. **Methods:** A voluntary, anonymous web-based survey was sent by email to all 44 EM resident physicians in July 2022. The survey included multiple choice, 5-point Likert scale, and free response questions derived from Accreditation Council for Graduate Medical Education pharmacotherapy competency-based milestones. **Results:** Thirty-six of the 44 (82%) residents completed the survey and all 10 PGY-4 class residents completed the survey. Nearly half of the respondents (44.4%) reported they consulted/interacted with the EMCPs 3 to 5 times per week and this number increased with the level of training. Respondents most often consulted the EMCPs to obtain medication indications, antibiotic dosing, pediatric dosing, and contraindications. Overall, respondents primarily reported strongly agree to all survey questions. Nearly all respondents strongly agreed the EMCPs are an important part of the patient care team and provide education that is different from what a supervising physician provides. All respondents who completed the pharmacy elective strongly agreed the elective was valuable and strongly recommended other residents to complete it. **Conclusion and relevance:** Respondents reported EMCPs are an important part of the patient care team, play a significant role in their training, and provide education that is different from what a supervising physician provides. Our findings encourage other institutions to leverage physicians' views of EMCPs to expand their service line.

Keywords

emergency medicine, clinical pharmacists, pharmacology, education, residents

Introduction

Emergency medicine clinical pharmacists (EMCPs) are increasingly recognized as an integral member of the emergency medicine (EM) team through their involvement in providing direct patient care and ensuring safe and effective medication delivery.[1-3] The American Society of Health-System Pharmacists (ASHP) guidelines on EM pharmacist services highlight the important role and additive benefits of having EMCPs, including increased compliance with best practices and reduced time to administration of critical medications.[2] National physician organizations, including the American College of Emergency Physicians (ACEP) and American College of Medical Toxicology (ACMT), also acknowledge the role of EMCPs in optimizing the care of EM patients in their position statements and support the staffing of EMCPs.[4,5] Furthermore, EM physicians and registered nurses' survey responses highlight how EMCPs positively contribute to the care of emergency department (ED) patients.[6-9] In these studies, respondents reported EMCPs contribute to medication and patient safety through their availability for general consultations and aid during resuscitations. Respondents reported they often consulted the EMCPs for antibiotic selection, drug interactions, dosing, medication compatibilities, and medication retrieval.

Although the clinical impact of EMCPs on patient care outcomes is well documented, their educational impact on

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resident physicians' training is not. Literature to date primarily describes the role of clinical pharmacists in primary care physician residency programs, where clinical pharmacy services have been established for years.[10-13] In comparison, EMCP services are relatively new, having first received recognition in 2005 from the Agency of Healthcare Research and Quality (AHRQ).[14] The AHRQ's funded project, Emergency Department Pharmacist as a Safety Measure in Emergency Medicine (HS015818), was developed to optimize the role of EMCPs and provide institutions with a reference tool for justifying and establishing EM pharmacy services. Since then, there has been an exponential increase in EM training positions and the board of pharmacy specialties recognized EM pharmacy as a specialty in 2020.[2] To further highlight the utility of EMCPs, this study evaluated EM resident physicians' perceptions of EMCPs' involvement in their training.

Methods

The University of California, San Francisco (UCSF) Fresno is a regional campus of the UCSF School of Medicine that was created to address physician shortages in California's San Joaquin Valley. As the largest academic physician training program between Sacramento and Los Angeles, the program includes 9 residency programs and 21 fellowship subspecialties. The EM physician residency program is one of the oldest EM programs in the country, established in 1974, and currently accepts 12 residents per year into its 4-year program. Community Regional Medical Center (CRMC) is the primary teaching site for the UCSF EM program and is the only Level 1 trauma center and burn center in central California with an annual ED volume surpassing 110,000.

At the time this study was conducted, the EMCP team consisted of 2 EMCPs who provided coverage 7 days per week, 12 hours per day (08:00-20:00), with 1 EMCP on service at a time. Both EMCPs have practiced as EMCPs at CRMC for over 5 years and completed a PGY-1 residency, with one of the EMCPs also completing a PGY-2 critical care residency. The primary role of the EMCPs is to provide bedside patient care via assisting with medication and dose selections, preparing and administering medications, and answering medication questions. The main pharmacy oversees order verification and medication dispensing for the ED so that the EMCPs may fulfill their primary accountabilities, in addition to their secondary accountabilities which include interdisciplinary education, precepting pharmacy learners, scholarly activities, leadership in institutional committees, quality improvement initiatives, and order set development. The EMCPs are not allotted dedicated time to complete their secondary accountabilities and will address them throughout their shifts.

To further integrate into the EM team, the EMCPs created a pharmacy elective for PGY-3 and PGY-4 EM physician residents in June 2019. Prior to the pharmacy elective, the EMCPs primarily provided bedside education, presented pharmacotherapy topics during weekly conferences, delivered clinical pearls during morning report, and answered drug-related questions when consulted. Topics were selected by the EMCPs or requested by the faculty and residents. Less formal interactions included emails sent from the EMCPs to the physician group notifying them of new order sets, workflows, and drug shortages. In addition, the EMCPs attended monthly EM physician meetings to provide department of pharmacy updates and input on drug-related agenda items.

The pharmacy elective is intended to assist the EM physician resident in identifying additional opportunities to integrate the EMCP in their daily practice and designing therapeutic regimens that reflect evidence-based practices, account for patient-specific characteristics, and cost-effective strategies. Rotation objectives include describing the different classifications of pharmacological agents, recognizing and acting upon common adverse effects and interactions, and incorporating institutional policies and evidence-based medicine into practice. The pharmacy elective spans 2-4 weeks and the EM physician residents will be on service 3 to 5 days a week for 4 to 8 hours per day. Emergency medicine physician residents who decide to take another elective during the same time period will opt for the shorter duration option. When a pharmacy learner is on service, the EM physician residents' shift will be shortened to minimize overlap with the pharmacy learner to ensure the securement of one-on-one time with the EMCP. During the pharmacy elective, the EM physician resident will accompany the EMCP to all resuscitations, assist with medication preparation and administration, answer the health care team's drug-related questions, and review drug-disease topics derived from ASHP's EM PGY-2 EM competency areas (Supplemental). The EMCPs attempt to cover all topics and aim to each individually review the topics with the EM physician residents to increase their retention. Emergency medicine physician residents interested in taking the elective contact the EMCPs several weeks in advance to discuss the schedule, their goals for the rotation, and to have the EMCPs sign the request for approval of elective rotation document.

To determine the EM physician residents' perceptions of the EMCPs involvement in their training, a voluntary, anonymous web-based survey was emailed to all 44 residents in July 2022. The survey was developed by the EMCPs with the assistance of the EM resident physicians' program director and included multiple choice, 5-point Likert scale, and free response questions derived from Accreditation Council for Graduate Medical Education pharmacotherapy competency-based milestones levels 1-4.[15] Residents had 3 weeks to complete the survey and received weekly reminders.

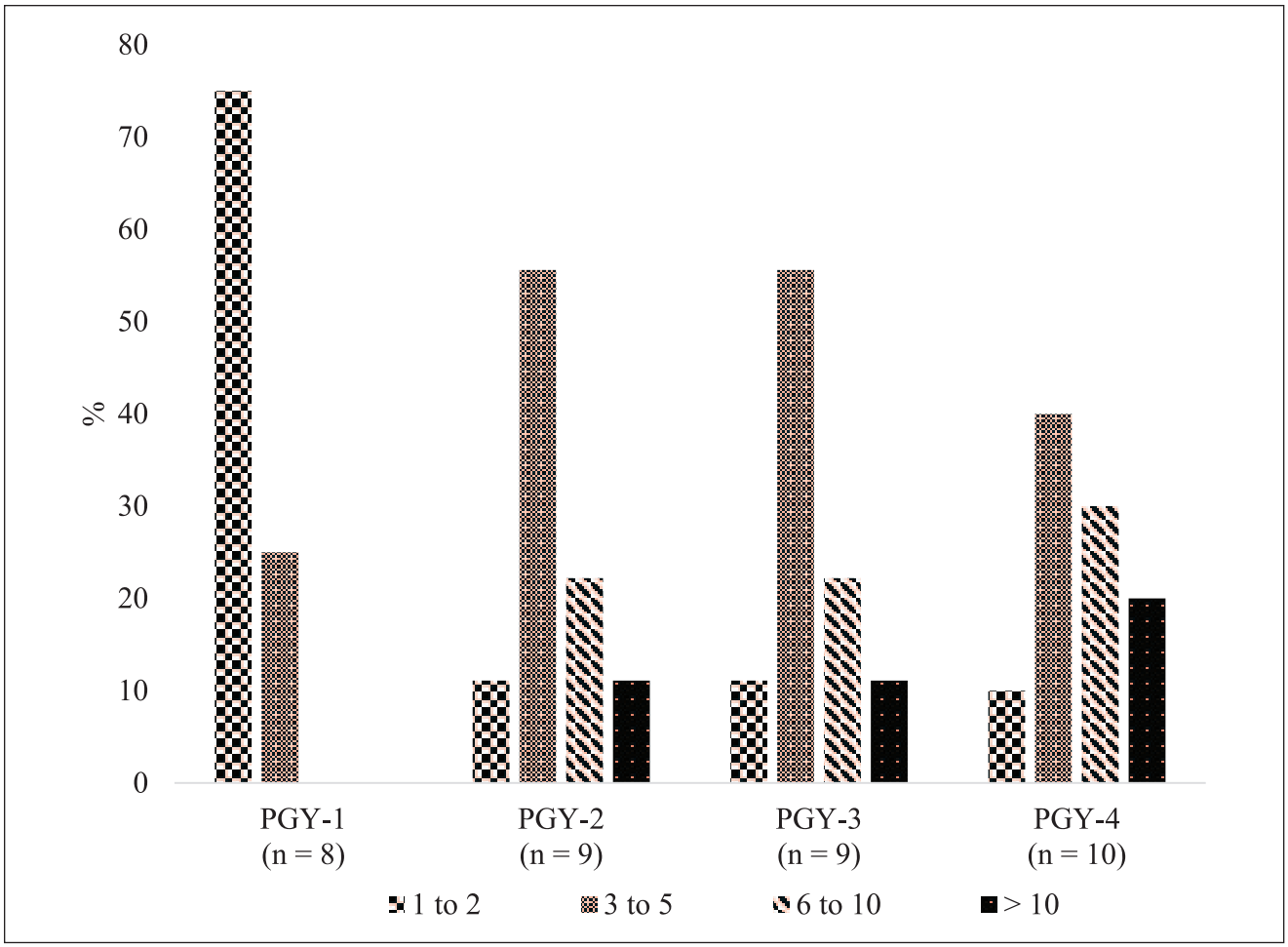

Figure 1. Number of weekly interactions per level of training.

Responses were analyzed using descriptive statistics. All study measures and procedures were approved by the local Institutional Review Board, and there are no conflicts of interest to report.

Results

Thirty-six of the 44 (82%) residents completed the survey and all 10 PGY-4 class residents completed the survey. Nearly half of the respondents (44.4%) reported they consulted/interacted with the EMCPs 3 to 5 times per week. The number of times respondents consulted/interacted with the EMCPs according to their level of training is shown in Figure 1. Respondents most often consulted the EMCPs to obtain medication indications (11.7%), antibiotic dosing (10.1%), pediatric dosing (9.7%), and contraindications (9.7%). Overall, respondents primarily reported strongly agree to all survey questions (Table 1). Nearly all respondents strongly agreed the EMCPs are an important part of the patient care team and provide education that is different from what a supervising physician provides. When asked if they felt comfortable asking the EMCPs for their recommendations and if they valued the opinion of the EMCPs, the majority of respondents reported strongly agree (97% and 94%, respectively). When asked if they have been involved in a situation where patient care suffered because there was not an EMCP on service, 48% of respondents said yes. Examples provided included increased times to administration of critical medications, pediatric resuscitations, post-code management, anticoagulant reversal, and medication reconciliation (Supplemental). Six of the 8 respondents who completed the pharmacy elective were PGY-4s and 92% of respondents who had not taken the elective reported they were considering it. All respondents who completed the elective strongly agreed the elective was valuable and recommended other residents to complete it. In a free response question, all respondents were able to provide examples of things they learned from the EMCPs (Supplemental). Examples provided included appropriate dosing, optimizing agent selection, and review of institutional order sets and policies.

Table 1. Survey Responses.

N (%)	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The EMCPs are an important part of the patient care team.	34 (94.4)	2 (5.6)	0 (0)	0 (0)	0 (0)
PGY-4 (n = 10)	10 (100)	0 (0)	0 (0)	0 (0)	0 (0)
PGY-3 (n = 9)	8 (88.9)	1 (11.1)	0 (0)	0 (0)	0 (0)
PGY-2 (n = 9)	9 (100)	0 (0)	0 (0)	0 (0)	0 (0)
PGY-1 (n = 8)	7 (87.5)	1 (12.5)	0 (0)	0 (0)	0 (0)
The EMCPs provide education that is different from what a supervising physician provides	34 (94.4)	2 (5.6)	0 (0)	0 (0)	0 (0)
PGY-4 (n = 10)	10 (100)	0 (0)	0 (0)	0 (0)	0 (0)
PGY-3 (n = 9)	8 (88.9)	1 (11.1)	0 (0)	0 (0)	0 (0)
PGY-2 (n = 9)	9 (100)	0 (0)	0 (0)	0 (0)	0 (0)
PGY-1 (n = 8)	7 (87.5)	1 (12.5)	0 (0)	0 (0)	0 (0)
The EMCPs have improved my ability to select appropriate agents based on patient preferences, allergies, cost, policies, and clinical guidelines	32 (88.9)	4 (11.1)	0 (0)	0 (0)	0 (0)
PGY-4 (n = 10)	10 (100)	0 (0)	0 (0)	0 (0)	0 (0)
PGY-3 (n = 9)	7 (77.8)	2 (22.2)	0 (0)	0 (0)	0 (0)
PGY-2 (n = 9)	9 (100)	0 (0)	0 (0)	0 (0)	0 (0)
PGY-1 (n = 8)	6 (75.0)	2 (25.0)	0 (0)	0 (0)	0 (0)
The EMCPs have improved my ability to recognize and act upon uncommon and unanticipated adverse effects and interactions.	27 (75.0)	7 (19.4)	2 (5.6)	0 (0)	0 (0)
PGY-4 (n = 10)	10 (100)	0 (0)	0 (0)	0 (0)	0 (0)
PGY-3 (n = 9)	5 (55.6)	3 (33.3)	1 (11.1)	0 (0)	0 (0)
PGY-2 (n = 9)	6 (66.7)	3 (33.3)	0 (0)	0 (0)	0 (0)
PGY-1 (n = 8)	6 (75.0)	1 (12.5)	1 (12.5)	0 (0)	0 (0)
The quality of care provided to patients suffers if there is no EMCP.	27 (75.0)	8 (22.2)	1 (2.8)	0 (0)	0 (0)
PGY-4 (n = 10)	10 (100)	0 (0)	0 (0)	0 (0)	0 (0)
PGY-3 (n = 9)	6 (66.7)	3 (33.3)	0 (0)	0 (0)	0 (0)
PGY-2 (n = 9)	6 (66.7)	3 (33.3)	0 (0)	0 (0)	0 (0)
PGY-1 (n = 8)	5 (62.5)	2 (25.0)	1 (12.5)	0 (0)	0 (0)
I provide better care to my patients because of my interactions with the EMCPs.	32 (88.9)	4 (11.1)	0 (0)	0 (0)	0 (0)
PGY-4 (n = 10)	10 (100)	0 (0)	0 (0)	0 (0)	0 (0)
PGY-3 (n = 9)	8 (88.9)	1 (11.1)	0 (0)	0 (0)	0 (0)
PGY-2 (n = 9)	9 (100)	0 (0)	0 (0)	0 (0)	0 (0)
PGY-1 (n = 8)	5 (62.5)	3 (37.5)	0 (0)	0 (0)	0 (0)
I would like to have more opportunities to learn from the EMCPs.	33 (91.7)	3 (8.3)	0 (0)	0 (0)	0 (0)
PGY-4 (n = 10)	10 (100)	0 (0)	0 (0)	0 (0)	0 (0)
PGY-3 (n = 9)	8 (88.9)	1 (11.1)	0 (0)	0 (0)	0 (0)
PGY-2 (n = 9)	9 (100)	0 (0)	0 (0)	0 (0)	0 (0)
PGY-1 (n = 8)	6 (75.0)	2 (25.0)	0 (0)	0 (0)	0 (0)

EMCPs: Emergency Medicine Clinical Pharmacists.

Discussion

In this study evaluating EM resident physicians' perceptions of EMCPs, respondents reported EMCPs are an important part of the patient care team, play a significant role in their training, and provide education that is different from what a supervising physician provides. Our findings positively contribute to the limited literature evaluating the educational impact of EMCPs.

In comparison to the existing literature, our study not only includes the largest number of EM resident physician respondents, but ours is the first study to solely evaluate EM resident physicians' perceptions of EMCPs. In a study conducted by Splawski et al,[6] providers and nurses at a non-academic institution reported EMCPs improve the quality of care in the ED, are an integral part of the team, and are a valuable teaching resource. In a study conducted by Coralic

et al,[9] the EMCPs received comparable responses to the same questions asked in the Splawski et al's study. However, unlike the Splawski et al's study, the Coralic et al's study was conducted at an academic institution with 32.7% of respondents being residents. In another study conducted at an academic institution, the EMCPs were reported to positively contribute to the care of patients in the ED, but were not viewed as a valuable teaching resource.[8] Similar to the Coralic et al's study, less than half of the respondents were providers and the authors did not specify how many were residents. Collectively, the findings from these studies and ours demonstrate EMCPs are viewed as integral members of the EM team.

We observed that only the PGY-4 class reported strongly agree to every question. As demonstrated in several other studies, physicians' perceptions and experiences are enhanced through increased interactions with clinical pharmacists.[13,16,17] In our study, the PGY-4 class reported the highest number of weekly interactions, whereas the PGY-1 class reported the least number of weekly interactions and were less likely to report strongly agree to the questions. Since there is only 1 EMCP on service at any given time, the EMCPs prioritize providing care to patients in the high acuity zones where they are unlikely to interact with the PGY-1 residents who primarily care for patients in the low acuity zones. In addition, the PGY-1 class complete multiple rotations outside the ED during their first year which further limits the number of opportunities to collaborate. However, despite a lower number of interactions, the EMCPs were still viewed positively by the PGY-1 class.

To our knowledge, this is the first study highlighting how EMCPs can serve as EM resident physician preceptors. Prior to the pharmacy elective, the EMCPs primarily provided didactic sessions during weekly conferences and bedside education. To further integrate into the EM team, the EMCPs created the pharmacy elective in June 2019. Since its creation, 18 residents have completed the rotation, despite a 1-year hiatus imposed at the start of the COVID-19 pandemic. Although the ACEP and ACMT position statements do not discuss the role of EMCPs as educators, the ASHP guidelines do, but do not explicitly state how EMCPs can serve as EM resident physician preceptors.[2,4,5] Although the ASHP guidelines acknowledge the types of education provided by EMCPs will vary, they note that more formal interactions such as in-services and didactic presentations may strengthen the relationship with other EM health care providers.[2] Considering this, our one-on-one interactions are expected to have highly influenced our study's results and support ASHP's views. Based on our findings, physician group position statements are encouraged to discuss the role of EMCPs as educators and pharmacy guidelines are encouraged to list precepting physician residents as an example of a type of education EMCPs can provide. Furthermore, our findings encourage EM physician residency programs to engage EMCPs as interprofessional educators for their trainees.

Our findings highlighted the need to create additional opportunities to interact with the PGY-1 class and supported the expansion of our team. We now provide an overview of our services during the PGY-1 class onboarding and lead more weekly conference sessions. At the time this study was conducted, our team consisted of 2 EMCPs who provided coverage 7 days per week, 12 hours per day, with 1 EMCP on service at a time (This work was presented as an abstract at the Society for Academic Emergency Medicine 2023 Annual Conference). We now have 4 EMCPs and provide 24/7 coverage with 1 EMCP on service at a time. Our findings encourage other institutions to leverage physicians' views of EMCPs to expand their service line.

This study has several limitations. The scope of practice of EMCPs varies across institutions and EMCPs are integrated into the EM team to varying degrees. Therefore, our findings may not be observed at institutions where EMCPs services are not established or do not prioritize EMCP bedside patient care. Although our questions were derived from Accreditation Council for Graduate Medical Education pharmacotherapy competency-based milestones, the EMCPs did not directly evaluate the physician residents for meeting these milestones. Not all residents who completed the survey took the pharmacy elective so we are uncertain how the groups would compare. Finally, our results did not include the views of graduated residents and are not free of recall and non-respondent biases.

Conclusion and Relevance

In this study evaluating EM resident physicians' perceptions of EMCPs, respondents reported EMCPs are an important part of the patient care team, play a significant role in their training, and provide education that is different from what a supervising physician provides. Our findings positively contribute to the limited literature evaluating the educational impact of EMCPs on resident physicians' training.

Declaration of Conflicting Interests

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Supplemental Material

Supplemental material for this article is available online.

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