BRIEF
REPORTS

Integration of Pharmacy Students Into Family Medicine Residency Clinics

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BACKGROUND AND OBJECTIVES: As interprofessional education opportunities become more prevalent within family medicine residency clinics, the benefit of the integration of pharmacy students is unclear in the current literature. Our study objective was to determine the impact of pharmacy student integration into a family medicine residency clinic on family medicine residents' attitudes toward interprofessional collaboration and satisfaction.

METHODS: Twenty-two pharmacy students on clinical rotation were individually paired with family medicine residents for approximately 4–5 half days per week over a 10-month period. Residents and students were given a pre/post-validated survey on attitudes toward interprofessional collaboration. Satisfaction surveys were also administered to the residents at the end of the study period. Written components of satisfaction surveys were evaluated for commonly occurring themes.

RESULTS: Matched survey responses were available for over 80% of the residents. Both pre- and post-survey responses showed positive attitudes toward physician-pharmacist collaboration. A statistically significant positive change was seen for one item in the family medicine resident surveys. Favorable written comments revealed positive themes toward pharmacy students providing mediation reviews, therapeutic recommendations, and patient education.

CONCLUSIONS: Pharmacy students can be integrated into family medicine residency clinics while maintaining positive levels of interprofessional collaboration and providing a perceived benefit to the family medicine residents.

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Interprofessional collaboration, specifically the pharmacist-physician collaboration in family medicine clinics has shown an improvement in various clinical outcomes.[1,2] This helped place pharmacists into approximately 22% of family medicine residency programs (FMRPs) in the United States.[1-3] In addition to providing medical resident education, pharmacists in resident clinics often serve as preceptors to pharmacy students earning their doctor of pharmacy degree. Both professions can benefit from this opportunity as the Interprofessional Education Collaborative (IPEC) has brought attention to the need for interprofessional collaborative practice.[4] Though interprofessional paired visits with pharmacy residents and family medicine residents have been evaluated, no available literature has examined interprofessional collaboration with pharmacy students in a family medicine residency clinic.[5] Understanding this impact can provide justification for future interactions to enhance family medicine education, help meet IPEC core competencies, and alleviate potential concerns. The objective of this study was to determine the impact of pharmacy student integration into a family medicine residency clinic on family medicine residents' attitudes toward interprofessional collaboration and satisfaction.

Methods

This prospective study was conducted from August 2014 through June 2015 at two FMRPs sponsored by the Department of Family and Community Medicine at the University of Kansas School of Medicine-Wichita (KUSM-W). Prior to this study period a pharmacy faculty member was integrated into each clinic for 1 year; however, neither had been exposed to pharmacy students. Pharmacy students were in their fourth and final professional year, completing a 1-month clinical rotation with a pharmacy faculty preceptor. At least one pharmacy student was present in the clinics for most months over the study period for approximately 4–5 half days per week. Each pharmacy student was paired with a resident per clinic

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session to see the resident's patients in collaboration. In this model, the pharmacist faculty member served as a preceptor with attending physicians to supervise the interprofessional team. Prior to clinic, pharmacy students reviewed medications and discussed potential pharmacotherapy recommendations with their pharmacist preceptor. The pharmacist faculty was readily available for instruction and support. Therefore, pharmacy students and family medicine residents worked as peers, rather than a preceptor-preceptee relationship.

Attitudes toward interprofessional collaboration were measured using the validated Scale of Attitudes Toward Physician-Pharmacist Collaboration (SATP2C).[6,7] Participants were asked to voluntarily complete the 16-item survey by ranking their agreement on a 4-point Likert scale (1=strongly disagree to 4=strongly agree). Family medicine residents were administered the survey prior to pharmacy students starting in clinic and again at the end of the study period. Pharmacy students received the same survey at the start and end of their 1-month rotation. Survey responses were matched

Table 1: Scale of Attitudes Toward Physician-Pharmacist Collaboration

Items	Survey Scores			
	Medical Residents Median (SD), n=44		Pharmacy Students Median (SD), n=21	
	Pre-	Post-	Pre-	Post-
A physician should be viewed as a collaborator and colleague with a pharmacist rather than his/her superior.	3.6 (0.5)	3.7 (0.5)	3.5 (0.6)	3.5 (0.5)
Pharmacists are qualified to assess and respond to patients' drug treatment needs.	3.5 (0.5)	3.6 (0.6)	3.7 (0.5)	3.8 (0.4)
During their education, pharmacy and medical students should be involved in teamwork in order to understand their respective roles.	3.7 (0.5)	3.7 (0.5)	3.6 (0.5)	3.8 (0.4)
Pharmacists can contribute to decisions regarding drug interaction that can affect the patients.	3.9 (0.3)	3.9 (0.3)	3.8 (0.4)	3.9 (0.3)
Pharmacists should be accountable to patients for the drug they provide.	3.3 (0.5)	3.4 (0.5)	3.8 (0.4)	3.8 (0.4)
There are many overlapping areas of responsibility between pharmacists and physicians in the drug treatment of patients.	3.6 (0.5)	3.7 (0.5)	3.5 (0.5)	3.8 (0.4)
Pharmacists have special expertise in counseling patients on drug treatment.	3.7 (0.5)[a]	3.9 (0.3)[a]	3.8 (0.4)	3.9 (0.3)
Both pharmacists and physicians should contribute to decisions regarding the type and dosage of medicine given to the patients.	3.6 (0.5)	3.5 (0.6)	3.6 (0.5)[b]	3.8 (0.4)[b]
The primary function of the pharmacist is to fill the physician's prescription without question.[c]	1.4 (0.5)	1.5 (0.5)	1.6 (0.5)[b]	1.3 (0.5)[b]
Pharmacists should be involved in making drug policy decisions concerning the hospital/pharmacy services upon which their work depends.	3.5 (0.5)	3.6 (0.6)	3.5 (0.5)[b]	3.7 (0.5)[b]
Pharmacists as well as physicians should have responsibility for monitoring the effects of drugs on the patients.	3.3 (0.6)	3.2 (0.7)	3.5 (0.3)	3.6 (0.5)
Pharmacists should clarify a physician's order when they feel that it might have the potential for detrimental effects on the patient.	3.7 (0.4)	3.8 (0.4)	3.9 (0.3)	4.0 (0.2)
Physicians and pharmacists should be educated to establish collaborative relationships.	3.7 (0.5)	3.8 (0.4)	3.7 (0.5)	3.8 (0.4)
Physicians should consult pharmacists for helping patients with adverse reaction or refractory to drug treatment.	3.6 (0.5)	3.7 (0.5)	3.6 (0.5)	3.8 (0.4)
Physicians should be made aware that pharmacists can help in providing the right drug treatment.	3.7 (0.5)	3.6 (0.6)	3.8 (0.4)	3.9 (0.4)
Interprofessional relationships between physicians and pharmacists should be included in their professional education programs.	3.6 (0.5)	3.6 (0.5)	3.6 (0.5)	3.8 (0.4)

Scale: 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree

[a] Family medicine resident response significant at $P<.05$, [b] Pharmacy student response significant at $P<.05$, [c] Reverse score item

Table 2: Family Medicine Resident Satisfaction With Pharmacy Student Integration

Item	Mean (SD) n=44
Overall, I am satisfied with the interactions I have had with pharmacy students.	3.6 (0.5)
Having pharmacy students with me in clinic helped increase my efficiency in clinic.	2.9 (0.8)
My knowledge improved as a result of interacting with pharmacy students.	3.3 (0.6)
My patients benefitted from pharmacy students being involved in their care.	3.5 (0.5)

Scale: 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree

using a unique ID code. Residents were also administered a satisfaction survey regarding pharmacy student collaboration with the same 4-point Likert scale and given prompts for written comments.

Changes between pre- and post-survey results were analyzed for significance using the Wilcoxon signed-rank test. Satisfaction data were analyzed using descriptive statistics. All data were analyzed using SPSS, v. 22.0, software system (IBM, Armonk, NY). The two investigators independently reviewed written comments to identify qualitative themes and convened to reach a consensus. Investigators also quantitatively evaluated the comments to determine the frequency of common themes. The KUSM-W Institutional Review Board determined review was not required.

Results

The matched survey responses were completed by 44/52 (85%) family medicine residents and 21/22 (95%) pharmacy students. A statistically significant positive change ($P<.05$) was seen for one item in the family medicine resident surveys and three items in the pharmacy student surveys (Table 1).

The satisfaction survey revealed that family medicine residents were satisfied with their interactions with pharmacy students (mean response=3.6). Residents agreed that pharmacy students help increase efficiency in clinic, improve knowledge, and benefit patient care (Table 2). Common themes from written comments are in Table 3.

Discussion

This study revealed that pharmacy students could be integrated into family medicine residency clinics while maintaining positive levels of interprofessional collaboration and providing a perceived benefit to the residents. Evaluating two different residency programs with a matched survey response rate >80% was a strength of this study. High levels of interprofessional attitudes at baseline make it difficult to demonstrate a significant improvement. Existing integration of a pharmacist in clinic and possible exposure to interprofessional education prior to residency may have influenced positive interprofessional attitudes at baseline.

Satisfaction survey results and written comments provide valuable insight on the success of pharmacy student integration. A valid

Table 3: Resident Satisfaction Themes Toward Pharmacy Student Collaboration

Theme	Theme Appearance (%)
Positive aspects of interaction (n=34)	
Medication reviews	50%
Patient education	38%
Therapeutic recommendations	29%
Drug information resource	12%
Resident education	9%
Opportunities for improvement (n=23)	
Proactively identify patients with high pharmacy needs	26%
Increased time for collaboration	22%
Separate pharmacy consults	17%
More education from students	13%

concern of having additional learners in clinic was the potential for slowing down office visits. However, satisfaction survey results revealed that residents were more likely to agree pharmacy students improved their efficiency. Themes from written comments suggest this may be due to pharmacy students being able to review medications and provide recommendations prior to each patient visit. Pharmacy students were also available to provide patient education and answer questions on new or existing medications freeing up time for the residents to move on to the next patient. Knowledge improvements may be related to pharmacy students communicating medication side effects and interactions to the residents. Additionally, the authors observed residents explaining their rationale and teaching the pharmacy students, thereby enhancing their own understanding of medication effects and selection. These identified advantages likely explain the resident agreement with pharmacy students benefiting patient care. These findings are of notable impact because while one may expect a student to benefit in this learning experience it was unclear what level of value the family medicine residents would gain.

This study is not without limitations. While family medicine residents portrayed their positive feelings toward pharmacy students impacting patient care, this study did not measure clinical outcomes associated with interprofessional visits. Similarly, patients expressed gratitude with pharmacy students being involved with their care but were not formally surveyed. Future areas of research could associate the interprofessional collaboration with meeting various patient-centered medical home, quality, and patient satisfaction measures. This study demonstrates that the integration of pharmacy students can have a positive impact on family medicine residents, which has future implications as the importance and prevalence of interprofessional care grows.

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