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Publication rates and characteristics of PGY2 psychiatric pharmacy resident research projects

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Abstract

Introduction: To describe the publication rates and characteristics of PGY2 psychiatric pharmacy residency projects presented as a poster presentation at the annual meetings of the College of Psychiatric and Neurologic Pharmacists (CPNP) from 2002 to 2018. (As of 2022 the organization is under the name, American Association of Psychiatric Pharmacists.)

Methods: CPNP abstracts from even years were strategically searched in PubMed, Ovid MEDLINE, and Google Scholar. If a publication was identified, additional data were collected for characterization, including study information, journal information, author information, institutional affiliation, publication year, and time to publication.

Results: A total of 348 abstracts were evaluated. Publication in a journal was achieved for 60 projects (17.2%), with publication rates decreasing from 2012 to 2018. The mean time to publication was 17.3 months after completion of the residency, with most projects published at 8 months. More than half (51.7%) of these projects were published in a psychiatric pharmacy journal affiliated with CPNP. Study designs were predominantly retrospective, observational, cohort studies with a focus on evaluation of a drug therapy outcome. The PGY2 resident was the first author in 90% of the publications. Forty percent included other health care professionals outside of pharmacy as a coauthor. PGY2 residencies affiliated with academic institutions had overall higher publications rates.

Discussion: Publication rates for PGY2 psychiatric pharmacy residency projects are low and are decreasing over time despite an increasing number of PGY2 psychiatric pharmacy residency programs. This publication rate is lower than that reported in the literature for PGY2 critical care residency programs. The downward trend of publication rates for PGY2 psychiatric pharmacy residency projects is concerning.

Keywords: publication, psychiatric pharmacy, research, residency project, PGY2 resident

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Introduction

The American Society of Health-System Pharmacists (ASHP) is the accrediting body for PGY1 and PGY2 pharmacy residency programs. In order for pharmacy residents to graduate from accredited residency programs, there are certain required competencies with goals and objectives that must be met. ASHP also has separate competencies, goals, and objectives for residents who choose to specialize through an ASHP-accredited PGY2 program. One of the required objectives for PGY2 psychiatric pharmacy residents is to "effectively develop and present, orally and in writing, a project report suitable for publication related to care of patients with psychiatric and neurologic disorders or for a topic for advancing the pharmacy profession or psychiatric pharmacy at a local, regional, or national conference."[1] This is more stringent than the objective required of PGY1 pharmacy residents, which states, "effectively develop and present, orally and in writing, a final project report."[2] This puts an emphasis on creating a research project suitable for publication during the PGY2 residency. However, publication of the project is not a stipulation for graduation from a PGY2 pharmacy residency program.[3,4]

It is estimated that only 10% to 15% of PGY1 pharmacy resident projects are published,[3,5] despite the increase in the number of PGY1 residency positions.[5,6] PGY1 pharmacy residents usually present their research projects in a poster format at the regional or national level, but evidence shows pharmacy residents are not pursuing publication in a peer-reviewed journal.[4,6-9] Publication rates of pharmacy resident projects presented at the Western States Conference from 1995 to 2008 ranged from 4.2% to 8.2%, whereas those presented at the Southeastern Residency Conference in 1981, 1991, and 2001 had publication rates of 20%, 16%, and 13%, respectively.[4,8,9]

A PGY2 residency provides an opportunity to build on the PGY1 scholarly experience through completion of a residency project in a specialty area with potentially increased complexity. There is limited information regarding publication rates of PGY2 residency projects because only 2 studies[10,11] have evaluated this issue and both are in PGY2 critical care pharmacy. Both studies used a survey to identify publication rates of PGY2 critical care pharmacy residency projects. One study,[10] which surveyed residency program directors, reported a publication rate of 37% in 2011 and 35% in 2012. The other study[11] surveyed residency graduates and found only 26% of the survey respondents published their residency research project within 3 years of completing their training.

There are many benefits associated with successful publication of a residency project in a peer-reviewed journal. Most importantly, dissemination of knowledge contributes to the improvement of patient care, the field of pharmacy, and the medical community as a whole. Development of networking opportunities and the ability to collaborate with other health care professionals on future projects can occur. From the resident's perspective, it provides the opportunity to learn the publication process and develop an appreciation for the time and effort required of a project from beginning to end. Gaining this experience during residency may increase the resident's confidence in the publication process.[2] Pharmacy residents who publish their residency research project are twice as likely to publish again in the 5 years following completion of their residency compared with residents who did not publish their residency project.[12] If the trainee seeks employment in academia, lack of training in research may hinder success and is also thought to be a factor contributing to faculty burnout.[5] In summary, residents with a publication can distinguish themselves from others, which can potentially expand their networking, collaboration, and career opportunities. Publications also are a sign of scholarly success for the resident, coauthors, preceptors, residency program, and institution. Evidence of publications can be a favorable attribute for resident recruitment. Recognizing coinvestigators on publications may help with professional or academic promotions, which can justify the time and effort that goes into residency projects.

Currently, there are no studies describing the publication rates of PGY2 psychiatric pharmacy residency research. The primary objective of this study is to evaluate the publication rates of PGY2 psychiatric pharmacy residency projects presented as a poster presentation at the College of Psychiatric and Neurologic Pharmacist's (CPNP) annual meetings. (As of 2022 the organization is under the name, American Association of Psychiatric Pharmacists.) Secondary objectives include identifying characteristics of the PGY2 psychiatric pharmacy residency projects and their subsequent publications, as well as the trends in publication rates over time.

Methods

This retrospective cohort study was conducted using poster abstracts presented by PGY2 psychiatric pharmacy residents at the annual meetings of CPNP from 2002 to 2018. CPNP was selected based on being the sole professional specialty pharmacy organization serving the needs of psychiatric pharmacists and trainees. This annual meeting offers an opportunity for pharmacy residents to present their research projects in a poster format and have the abstract published on both the conference website and in a peer-reviewed clinical practice journal. The first annual meeting where abstracts were posted on the organization's website was 2002, and thus the time from 2002 to 2018 was chosen as our study period. Based on literature reviews[4,6,8,13,14] it was determined that it may require up to 2 years after

TABLE 1: Publication rates of poster abstracts submitted to the College of Psychiatric and Neurologic Pharmacists (CPNP) annual meetings 2002-2018

	Year of Abstract Submission to CPNP									
	2002	2004	2006	2008	2010	2012	2014	2016	2018	Totals
CPNP abstracts meeting inclusion criteria, No.	1	7	13	14	30	44	55	82	102	348
Confirmed publication, No.	0	0	0	0	7	12	12	16	13	60
Published, %	0	0	0	0	23.3	27.3	21.8	19.5	12.7	17.2

graduating from a residency program for a project to be published. An end date for abstract selection of 2018 was used to allow for data collection to end in 2020. Abstracts from even years were obtained from the CPNP's website or within publications. CPNP did not distinguish between resident and other health care professional abstract submissions (psychiatric pharmacists, students, physicians, psychologists, etc) until 2017. Therefore, abstracts between 2002 and 2016 were considered submitted by a PGY2 resident if the primary author held a Doctor of Pharmacy degree and the abstract was categorized as a Work in Progress. Exclusion criteria consisted of primary authors with board certifications that require more than a PGY1 residency (ie, Board Certified Psychiatric Pharmacist), primary author was lacking credentials (ie, student), primary author had credentials other than a PharmD (ie, MD, PhD), and abstracts submitted in other categories, such as an Encore Presentation or Original Research. Designation of Board Certified Pharmacotherapy Specialist (BCPS) was allowed because this certification can be obtained following completion of a PGY1 residency.

CPNP abstracts from even years were strategically searched. Publications were identified using 3 online databases provided by the University of Missouri-Kansas City (UMKC) Health Science Library. These were PubMed, Ovid MEDLINE, and Google Scholar. Each search within the search engine included the following sequential steps: (1) primary author's last name and first initial; and (2) primary author's last name, first initial, and 3 to 5 keywords from the project title. If there were no *hits* with the primary author, the same strategy was performed for all abstract coauthors until the list was exhausted. At any point during the search strategy in which a publication was found, it was considered publication positive, and the search was deemed complete. If no results populated in the 3 databases, it was considered publication negative. The total number of publications that resulted from the eligible abstracts submitted to CPNP was calculated. For each *positive* publication, additional data were collected to characterize the publication. The following data were collected: study characteristics, study funding, abstract submission status (ie, results contained within abstract vs results pending), institutional and location affiliations, journal information, and primary and coauthor information.

The study was reviewed and categorized as exempt by the UMKC Institutional Review Board. Data were collected and managed using REDCap (Research Electronic Data Capture) hosted at the UMKC Center for Health Insights.[15] REDCap is a secure, web-based application designed to support data capture for research studies. Publication rates and characteristics were reported using descriptive statistics.

Results

Of the 348 posters presented at the CPNP annual meetings in even years between 2002 to 2018, 60 were published (Table 1). The overall average publication rate during the study period was 17.2%. There were no publications identified from 2002 to 2008. Publication rates of PGY2 psychiatric pharmacy residents decreased over time from 2012 to 2018 despite an increasing number of PGY2 psychiatric pharmacy residency positions during this time frame (Table 1). It was assumed that the residencies ended in June; therefore, July 1 of the year that the poster was presented was used to calculate time to publication. For example, if the abstract was submitted in 2016 and the published article was dated August 2016, then the time to publication was deemed 2 months. Time to publication ranged from 3 months before the end of residency to 54 months after residency completion. The mean time to publication was 17.3 months, with most completed within 8 months.

Characteristics associated with the publications of PGY2 residency projects are presented in Table 2. Study designs in these publications were predominantly retrospective, observational, cohort studies focused on the evaluation of a drug therapy outcome. Most residency projects (n = 43; 71.7%) were published in a journal with a pharmacy focus and a mean impact factor of 0.76 (ranged from 0.000 to 5.020). Approximately half (51.7%) of the publications were in *Mental Health Clinician*, which is a peer-reviewed journal affiliated with CPNP (Table 3). Lastly, the number of citations for published articles ranged from 0 to 44 with a mean number of citations being 4.75.

The PGY2 resident was the first author in 90% of the publications. The number of coauthors ranged from 1 to 12, with the greatest portion having 2 coauthors. Forty percent

TABLE 2: Characteristics of publications associated with PGY2 psychiatric pharmacy residency projects (n = 60)

	No. (%)
Results on abstract submitted to CPNP	
None	52 (86.7)
Preliminary	4 (6.7)
Final	4 (6.7)
Type of journal	
Pharmacy	43 (71.7)
Nonpharmacy	17 (28.3)
Resident as primary author	
Yes	54 (90)
No	6 (10)
No. of coauthors	
≤3	40 (66.7)
4-6	16 (26.7)
≥7	4 (6.7)
Coauthors with BCPP certification	
Yes	50 (83.3)
No	10 (16.7)
Other health care providers as coauthors	
Yes	24 (40)
No	36 (60)
Study design	
Observational	49 (81.7)
Interventional	11 (18.3)
Direction of interest	
Retrospective	48 (80)
Prospective	12 (20)
Direction of inquiry	
Drug	26 (43.3)
Human	17 (28.3)
Other	17 (28.3)
Study type	
Cohort	27 (45)
Cross-sectional	12 (20)
Other	21 (35)
Institution type	
University affiliated	38 (63.3)
Veterans Affairs	20 (33.3)
Nonuniversity/non-Veterans Affairs	1 (1.7)
Other	1 (1.7)
Project funding	
Yes	2 (3.3)
No	58 (96.7)
Time to publish, mo	
≤12	23 (38.3)
13-24	25 (41.7)
25-36	7 (11.7)
>36	5 (8.3)
No. of citations	
≤10	52 (86.7)
11-20	6 (10)
>20	2 (3.3)

CPNP = College of Psychiatric and Neurologic Pharmacists.

of the articles included other health care professionals outside of pharmacy (RN, PhD, MD, DO, etc) as a coauthor. If there was no mention of funding in the published article, then the study was assumed to have no funding; therefore, most studies were deemed to be not funded (96.7%). Residencies affiliated with academic institutions (63.3%) had overall higher publications rates.

Discussion

This study concluded that PGY2 psychiatric pharmacy residents who presented their residency project as a poster presentation at CPNP's annual meeting are publishing their work in a scientific journal at an overall rate of 17.2%. The

TABLE 3: Journals publishing PGY2 psychiatric pharmacy residency project

Journal Name	No. of Publications
Mental Health Clinician	31
Journal of Pharmacy Practice	4
Innovations in Clinical Neuroscience	3
American Journal of Pharmaceutical Education	2
Federal Practitioner	2
Journal of the American Pharmacists Association	2
Primary Care Companion for CNS Disorders	2
American Journal of Health-System Pharmacy	1
Annals of Clinical Psychiatry	1
Annals of Pharmacotherapy	1
Community Mental Health Journal	1
INNOVATIONS in Pharmacy	1
Journal of Addictive Diseases	1
Journal of Emergency Medicine	1
Journal of Public Health Management and Practice	1
Journal of the American Medical Directors Association	1
Military Medicine	1
Psychiatric Quarterly	1
Psychiatric Services	1
Psychopharmacology Bulletin	1
Substance Abuse	1

publication rate found in our study is similar to that seen in PGY1 pharmacy residencies.[4,8,9,11] A study analyzing publication rates of abstract presentations at 5 national pharmacy association meetings found an overall publication rate of 19.8%.[16] Compared with PGY2 residencies in critical care pharmacy, our rate of 17.2% is lower than their reported rates of 26-37%.[10,11] It is important to note that publication rates in our study were determined by a consistent, strategic process, whereas those in PGY2 critical care residencies were determined through survey techniques. Overall, publications associated with PGY2 psychiatric pharmacy residency projects are low, but this is not surprising based on data suggesting publication rates by pharmacists are low compared with other health care professions. A 2007 Cochrane review[17] including approximately 29 000 scientific abstracts presented between 1978 and 2003 found a weighted mean publication rate of only 44.5%, with publication rates associated with abstract presentations at pharmacy association meetings being significantly lower than other health professional disciplines.

Several factors may contribute to the low publication rate of PGY2 psychiatric pharmacy resident projects. Residency programs are time intensive for the resident, and they require completion of specific competencies, of which many are focused on patient care. Submitting a manuscript for publication is not a requirement in most programs and thus may not be a high priority for the resident because of time constraints. The timing of manuscript submission for publication can be problematic because this would occur toward the end of the residency program as the resident is exiting the program. Lastly, residency preceptors may lack the training, time, and research resources to assist the resident with submission of a manuscript for publication.

There is a concerning downward trend in publication rates for PGY2 psychiatric pharmacy residency projects during the time frame of 2012 to 2018. During this same time frame, the number of PGY2 psychiatric pharmacy residency programs increased by more than 200%. In 2011, there were 31 PGY2 psychiatric pharmacy residency positions in the United States. This number more than doubled to 80 positions in 2016 and 100 positions in 2021.[18] This increase is reflected in the number of abstracts submitted to CPNP; however, the number of residency projects published did not increase. This finding may be the result of the expansion of nonacademic affiliated PGY2 psychiatric pharmacy residency programs where focus is placed on patient care.

Although publication rates for PGY2 critical care pharmacy residency projects have been described, neither of the studies provided a detailed characterization of the published studies.[10,11] Our study found that publications associated with PGY2 psychiatric pharmacy residency projects were most likely to be retrospective and observational in study design with a focus on drug therapy in a facility with an academic affiliation. An impressive finding of our study was that PGY2 psychiatric pharmacy residents were more likely to be the first author of the publications compared with PGY2 critical care pharmacy residents (90% vs 67%).[11] This suggests that publications coming from PGY2 critical care pharmacy residency programs may not be fully initiated or completed by the resident, which may account for the overall higher publication rates in this specialty residency program.

The average time from completion of residency to publication of a manuscript in our study was found to be 13 to 24 months (41.7%). This may contribute to low publication rates of residency projects because the resident has completed their residency training and left the program. There are no data for comparison in the PGY2 critical care pharmacy residency programs. The average time to publication has been described to be approximately 24 months for PGY1 Pharmacy Practice residencies.[4,8,13,14]

This is the first study to determine publication rates and characteristics associated with PGY2 psychiatric pharmacy residency projects. Other strengths of this study include the use of 3 different online databases and a consistent literature search methodology to identify publications. Steps were taken in our study to ensure publications were not missed due to name changes and also to include only those publications authored by PGY2 residents.

One limitation of our study is inclusion of abstracts from only even years during the study time frame, because it is possible that inclusion of all years may have resulted in a different outcome. Limiting abstract selection to only those described as a work in progress could have resulted in missing abstracts that should have been included in the study because the residency project may have been presented in a different category (ie, Original Research). It is possible that more projects were published than detected in our study if they were not cataloged in PubMed, Ovid MEDLINE, or Google Scholar. The study allowed for 2 years after completing residency to determine if the resident's project was published. This could lead to the possibility of missing publications that were published after the study window. Also, not all PGY2 psychiatric pharmacy residency programs require submission of the resident's project to a national meeting, or the abstract could be rejected by CPNP. If these projects resulted in a publication, they would not be included in our study. Another limitation of this study is designation as a PGY2 psychiatric pharmacy resident was assumed based on inclusion and exclusion criteria and thus there was a risk of including or missing publications in our study.

Conclusion

The study results demonstrate a low publication rate for PGY2 psychiatric pharmacy residency research projects

despite an increasing number of PGY2 psychiatric pharmacy residency programs. Future studies identifying PGY2 residency program director and PGY2 psychiatric pharmacy resident perceived values and barriers to publication would be a beneficial contribution to the current body of literature. Publishing research in peer-reviewed scientific journals has many benefits to the medical community, resident, preceptors, and local institution.

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