RESEARCH

A Bibliometric Analysis of Peer-Reviewed Journal Publications of Pharmacy Practice Department Chairs

Dave L. Dixon, PharmD,[a] Diana M. Sobieraj, PharmD,[b] Roy E. Brown, MLIS,[c]
Rachel A. Koenig, MA, MLS,[c] Madeleine Wagner, BA,[a] William L. Baker, PharmD[b]

[a] Virginia Commonwealth University, School of Pharmacy, Richmond, Virginia
[b] University of Connecticut, School of Pharmacy, Storrs, Connecticut
[c] Virginia Commonwealth University, Health Sciences Library, Richmond, Virginia

Objective. To perform a bibliometric analysis of pharmacy practice department chairs at US schools and colleges of pharmacy to determine factors associated with their level of scholarly productivity.

Methods. Scopus was searched for all publications by pharmacy practice chairs from all pharmacy schools through August 11, 2020. Publication metrics (total number of publications and citations and the Hirsch-index (h-index), and year of first publication), as well as characteristics of the individual chair and institution were collected. Characteristics were compared across groups. A generalized linear model was used to determine the correlation between the total number of publications and h-index to school ranking by *US News & World Report* (*USNWR*).

Results. One hundred forty-one pharmacy practice chairs were identified. The majority were male and at the rank of professor, with a similar proportion from public and private institutions. The median total number of publications and citations was 19 and 247, respectively, with a median h-index of eight. Compared with female chairs, male chairs had a higher median total of publications and citations and a higher h-index. Chairs at public institutions had a higher median total of publications and citations and a higher publication rate, h-index, and m quotient. The *USNWR* ranking for the school was significantly correlated with total publications and the h-index.

Conclusion. Pharmacy practice chairs vary significantly in their scholarship productivity, although those at institutions with a larger emphasis on research were more prolific. Observed differences in the publication metrics of male and female chairs warrants further study to determine possible explanations for this finding and its potential impact.

Keywords: publications, bibliometrics, chair, pharmacy

INTRODUCTION

Scholarship is a core element of academic pharmacy across all 144 schools and colleges of pharmacy in the United States. However, faculty expectations for scholarship vary widely according to whether the institution is public or private, whether it is part of a health sciences center, its ranking by the Carnegie Classification of Institutions of Higher Education (Carnegie Classification), and the faculty member's individual mix of duties.[1,2] Pharmacy schools often have multiple departments, each with its own ways of contributing to the institution's overall mission. Basic science departments, such as medicinal chemistry or pharmacology, for example, tend to be more focused on the research mission, while pharmacy practice (or clinical) departments are primarily focused on the teaching mission.[3] Faculty across all departments, however, are generally expected to make scholarly contributions, which primarily include authoring papers for publication in peer-reviewed journals but may also include writing textbook chapters and non-peer-reviewed work. Scholarly productivity is often an important consideration in determining the promotion and tenure of faculty members and is treated as one measure of faculty success.[4]

Individuals who achieve a certain level of success in academia may be given the opportunity to serve as a department chair. These mid-level administrative positions are filled by faculty who have been successful in most, if not all, areas of the academic triad and demonstrate considerable leadership abilities.[5,6] While these

Corresponding Author: Dave L. Dixon, Virginia Commonwealth University, School of Pharmacy, 1112 E. Clay St., Box 980533, Richmond, VA. Tel: 804-628-3784. Email: DLDixon@vcu.edu

individuals are generally faculty who are already well published before taking on such a role, they may continue to contribute to the literature through ongoing research as part of their mix of duties. The faculty within a pharmacy practice department are often a heterogenous group, and departments with a higher proportion of research faculty may have different expectations than those that are largely made up of clinical-track faculty. Given the absence of established benchmarks for scholarly productivity and the lack of available data for comparison, it may be challenging to assess this aspect of a candidate's qualifications in the hiring and evaluation process for pharmacy practice chairs.

The challenges of evaluating the scope and impact of an academic pharmacist's scholarly work have been extensively written about.[7-10] Instead of relying on a single measure, most schools consider various factors, including total number of publications, citation counts, the Hirsch index or h-index (publication of at least h papers that have each been cited at least h times), and the m quotient (number of years over which papers have been published).[8] Total number of publications and total citation counts are useful measures to assess raw productivity, but they may not provide insight into the quality or impact of the faculty member's work. The *h*-index has become a popular measure of quantity and quality as it assesses both the number of publications and their impact.[11] However, the h-index is challenging to interpret as a desirable h-index is largely discipline dependent and heavily favors more senior faculty who have had more time for their publications to accrue citations.[12] To address this issue, the m quotient is calculated by dividing the h-index by the number of years since the author's first publication.[11] More recently, there's been additional consideration for the impact of one's scholarly work online via social media, but this has yet to be associated with citation counts or other bibliometrics for pharmacy practice journals.[12] Regardless of the measure used, contemporary publication benchmarks for pharmacy practice chairs are warranted.[13]

The objective of this cross-sectional study was to perform a bibliometric analysis of pharmacy practice department chairs at schools and colleges of pharmacy using the accessible online database, Scopus. The analysis aimed to compare pharmacy practice chairs according to publication metrics assessed in previous studies or that are commonly used benchmarks at pharmacy schools, including faculty rank, Carnegie Classification, institution type (public or private), National Institutes of Health (NIH) funding ranking, and *US News & World Report* (*USNWR*) ranking.

METHODS

A search of the American Association of Colleges of Pharmacy's (AACP's) online faculty directory that we conducted May 1, 2020, identified active pharmacy practice chairs from all listed schools and colleges of pharmacy, regardless of the institution's accreditation status (n=144). The results were then confirmed using the faculty directory from each school's website. Any remaining discrepancies were resolved by contacting the college or school dean for clarification. We excluded schools that either did not list an active chair or had an equivalent position. We then conducted a search of Scopus by department chair name from the earliest available date through August 11, 2020. Searches were not limited by language or publication type. When there were multiple authors listed with the same name, information based on present and past organizational affiliations was used to ensure accuracy. Publication-related information collected for each department chair included total number of publications, total number of citations, h-index at the time of the search, and year of their first publication.

Additional information about the chair included their current faculty rank (assistant professor, associate professor, professor), and whether they had ever received National Institutes of Health (NIH) funding, which was obtained using the NIH RePORTER (https://reporter.nih.gov/). In order to evaluate whether any differences existed between male and female chairs, we also collected data on gender using multiple sources, including the individual's faculty profile on the school's website if available and the AACP Roster of Faculty and Professional Staff. Additionally, we used an application programming interface (Gender API, www.gender-api.com), that determines sex using a database of over 3.2 million validated names from 191 different countries and has been found to have the lowest fraction of inaccuracies and smallest proportion of unclassified names compared to similar platforms.[14] Because this information was not obtained directly from the department chairs, themselves, we will describe this characteristic as "sex" rather than "gender." Information about the department chair's institution included whether it was a private or public institution, association with a health sciences center (HSC), defined as, "an educational institution that includes a medical school and at least one allied health professional school and either owns or is affiliated with a teaching hospital or health care system,"[15] the institution's Carnegie Classification (research 1 [R1], research 2 [R2], or Special Focus), ranking according to NIH funding using the 2018-2019 Blue Ridge Institute for Medical Research (BRIMR), and ranking according to the *USNWR*.

Prior to analyses, additional calculations included years since first publication, publications per year (total number of publications divided by number of years since their first publication), and citations per publication (total number of citations divided by total number of

publications). We also calculated the m quotient by dividing the *h*-index by the number of years since their first publication (as of 2020). Pharmacy practice chair characteristics are presented either as proportions for dichotomous variables or as median (25th, 75th percentile) for continuous variables. Comparisons of characteristics across groups were made using either a chi-square or Kruskal-Wallis test according to the type of data. Identified groupings of interest included academic rank (assistant professor, associate professor, professor), Carnegie Classification, institution type (public vs private and HSC vs non-HSC), school ranking by NIH funding (top 25 vs below 25 vs unranked), and department chair sex (male vs female). We also ran a generalized linear model to determine the correlation between the total number of publications and *h*-index to school ranking (by USNWR). To further explore the impact of a faculty member's sex on publication metrics, post-hoc comparisons of school characteristics (academic rank, institution type, HSC, Carnegie Classification, and NIH funding) were made. We performed all analyses using SAS, 9.4 (SAS Institute), with a *p* value $<.01$ defined as statistically significant.

RESULTS

One hundred forty-one pharmacy practice chair persons or equivalents were identified and their publication metrics were extracted from Scopus. Six schools did not have a pharmacy practice chair or equivalent position, while three schools had more than one individual fulfilling this role. The characteristics of the chairs and their institutions are reported in Table 1. A majority of chairs were male (51.8%), held the rank of professor (56.0%). A similar proportion of chairs were from public (49.0%) and private (51.0%) institutions. The majority (61.2%) of the institutions at which the chairs served had affiliated health sciences centers and the majority (56.5%) were designated as Special Focus schools according to the Carnegie Classification. Only 9.9% of the chairs had received NIH funding for a project on which they were a principal investigator.

In general, the median (25th, 75th percentile) number of publications and citations was 19 (7, 36) and 247 (90, 958), with a median *h*-index of 8 (3, 13) and m quotient of 0.5 (0.3, 0.8). The median publication rate per year was 1.3 (0.7, 2.0) and the median number of citations per publication was 14.1 (7.7, 26.7). A comparison of the publication metrics for pharmacy practice chairs across individual and school characteristics is presented in Table 2. The median number of publications, total citations, and h-index were each higher for chairs at the rank of professor than for associate professor or assistant professor ($p < .001$ for all comparisons). Compared with female

Table 1. Characteristics of Pharmacy Practice Chairs at US Schools and Colleges of Pharmacy

Characteristic	Pharmacy Practice Chairs (n=141), n (%)
Academic Rank	
Assistant Professor	11 (7.8)
Associate Professor	51 (36.2)
Professor	79 (56)
Sex	
Male	73 (51.8)
Female	68 (48.2)
Institution Type	
Public	72 (49)
Private	75 (51)
Health Sciences Center	
Yes	57 (38.8)
No	90 (61.2)
Carnegie Classification	
R1	40 (27.2)
R2	24 (16.3)
Special Focus	83 (56.5)
NIH Funding as PI	
Yes	14 (9.9)
No	127 (90.1)

Abbreviations: NIH=National Institutes of Health, PI=principal investigator, R1=research 1, R2=research 2

chair persons, male chair persons had higher median total publications (16 vs 30; $p < .003$), more total citations (175 vs 404; $p = .02$), and a higher *h*-index (6 vs 10; $p = .01$), with similar publication rates ($p = .05$), citations per publication ($p = .19$), and m-quotient ($p = .23$). To further explore the relationship between the sex of pharmacy practice chair persons, we compared school characteristics between male and female chairs. As seen in Table 3, no differences were seen between male and female chairs in academic rank ($p = .98$), institution type ($p = .36$), HSC status ($p = .12$), Carnegie Classification ($p = .22$), or proportion with NIH funding for projects on which they served as a principal investigator ($p = .32$).

Publication metrics varied by institution type, with chairs at public institutions having more total publications ($p < .001$) and citations ($p < .001$), higher publication rate ($p < .001$), and higher *h*-index ($p < .001$) and m quotient ($p = .0014$). Findings were similar for chairs at HSC-based schools and those in the top 25 for NIH funding received. Significant differences were seen according to Carnegie Classification ($p < .01$ for all). Publication metrics were highest for R1 schools, and there were similar values between R2 and Special Focus schools.

Table 2. Publication Metrics for Pharmacy Practice Chairs at US Schools and Colleges of Pharmacy

Group	Total Publications	Pub/Yr	Total Citations	Citations/Pub	*h*-index	M Quotient
Overall	19 (7, 36)	1.3 (0.7, 2.0)	247 (90, 958)	14.1 (7.7, 26.7)	8 (3, 13)	0.5 (0.8, 0.8)
Academic Rank						
Assistant Professor	4 (0, 12)	0.9 (0.3, 1.3)	4 (0, 99)	5 (1.0, 11.2)	1 (0, 6)	0.3 (0.1, 0.5)
Associate Professor	11 (4, 21)	0.9 (0.6, 1.4)	127 (27, 301)	10.7 (5.5, 22.2)	4 (2, 9)	0.4 (0.2, 0.5)
Professor	30 (17, 68)	1.6 (1.0, 2.6)	567 (183, 1577)	19.4 (11.3, 31.2)	11 (6, 20)	0.5 (0.4, 0.9)
p value	<.0001	.0003	<.0001	.0003	<.0001	.002
Sex						
Male	30 (11, 55)	1.4 (0.7, 2.6)	404 (98, 1293)	18.0 (9.2, 30.2)	10 (4, 19)	0.5 (0.3, 0.8)
Female	16 (5.5, 24)	1.1 (0.8, 1.6)	175 (46.5, 618.5)	12.0 (7.4, 23.0)	6 (3, 10)	0.5 (0.3, 0.6)
p value	.003	.051	.017	.1861	.01	.27
Institution Type						
Public	32 (16.5, 74.5)	1.6 (0.9, 3.3)	417.5 (130.5, 2104.5)	18.0 (8.6, 30.6)	10.5 (6, 20)	0.6 (0.3, 1.0)
Private	13 (4, 22)	1.0 (0.6, 1.4)	169 (27, 439)	13.2 (7.7, 23.1)	6 (2, 9)	0.4 (0.3, 0.5)
p value	<.0001	<.0001	<.0001	.23	<.0001	.001
HSC-Based						
Yes	35 (21, 79)	1.8 (1.2, 3.3)	832 (183, 2332)	18.1 (10.4, 32.7)	12 (8, 22)	0.7 (0.4, 1.0)
No	12.5 (4, 23.5)	0.9 (0.6, 1.4)	144 (26.5, 449)	12.1 (5.7, 23.1)	5 (2, 9)	0.4 (0.3, 0.5)
p value	<.0001	<.0001	<.0001	.016	<.0001	<.0001
Carnegie Classification						
R1	62 (26.5, 121)	2.8 (1.6, 4.9)	1230 (260, 3518.5)	20.1 (12.4, 30.6)	18.5 (9, 29.5)	0.8 (0.5, 1.2)
R2	19 (12.5, 24.5)	0.9 (0.7, 1.4)	162.5 (47.5, 498.5)	7.7 (4.6, 21.8)	7 (4, 10.5)	0.4 (0.3, 0.5)
Special Focus	13 (4, 24)	1.0 (0.5, 1.4)	141 (37, 477)	13.5 (7.7, 29.7)	6 (2, 9)	0.4 (0.3, 0.6)
p value	<.0001	<.0001	<.0001	.008	<.0001	<.0001
NIH Funding Rank						
Top 25 (n=25)	83 (31, 133)	3 (1.7, 6.0)	1373 (832, 3471)	23 (14.9, 30.9)	20 (12, 30)	0.8 (0.6, 1.3)
Below 25 (n=51)	21 (11, 35)	1.4 (0.8, 2.0)	204 (90, 970)	11.9 (5.3, 31.2)	8 (4, 14)	0.4 (0.3, 0.7)
Unranked (n=62)	12 (4, 19)	0.9 (0.6, 1.3)	133 (36, 404)	13.5 (8.3, 23.0)	5 (2, 9)	0.4 (0.3, 0.5)
p value	<.0001	<.0001	<.0001	.01	<.0001	<.0001

Abbreviations: HSC=health science center, NIH=National Institutes of Health, PI=principal investigator, Pub=publication, R1=research 1, R2=research 2, Yr=year.

The USNWR rankings for the schools were significantly correlated both with total publications (R^2=0.21, $p < .001$) and h-index (R^2=0.27, $p < .001$) (Figure 1).

DISCUSSION

The scholarship record of pharmacy practice chairs has not been evaluated since 2009 when there were only 89 schools and colleges of pharmacy listed in the AACP directory.[16] Since that time, the number has increased by approximately 60%.[17] Thus, it is important to reevaluate the scholarship productivity of pharmacy practice chairs as these data could be useful for guiding faculty expectations in pharmacy practice departments, informing hiring decisions, and serving as benchmarks for making comparisons across institutions. In this study, we conducted a comprehensive evaluation of all pharmacy practice chairs' publication records.

Our results show a large variation in scholarship productivity among pharmacy practice chairs. Higher scholarship productivity was observed among chairs at higher faculty ranks, public institutions, HSCs, institutions with R1 Carnegie Classifications, a Top 25 NIH funding rank, and higher USNWR rankings. These findings were consistent with previous work in this area as these are indicators of more research-intensive institutions where scholarship may be a larger requirement in faculty mix of duties.[1,2,16,18-20] The limited number of chairs who had received NIH funding was not surprising given that attainment of NIH funding is rarely an expectation of pharmacy practice faculty or chairs. A large proportion (44%) of pharmacy practice chairs were at the rank of assistant or

Table 3. Characteristics of Pharmacy Practice Chairs by Sex

| Characteristic	Male, n (%) (n=73)	Female, n (%) (n=68)	*p* value
Academic Rank			.98
Assistant Professor	6 (8.2)	5 (7.4)	
Associate Professor	26 (35.6)	25 (36.8)	
Professor	41 (56.2)	38 (55.9)	
Institution Type			.36
Public	40 (54.8)	32 (47.1)	
Private	33 (45.2)	36 (52.9)	
Health Sciences Center			.12
Yes	34 (46.6)	23 (33.8)	
No	39 (53.4)	45 (66.2)	
Carnegie Classification			.22
R1	25 (34.3)	15 (22.1)	
R2	10 (13.7)	14 (20.6)	
Special Focus	38 (52.1)	39 (57.4)	
NIH Funding as PI			.32
Yes	9 (12.3)	5 (7.4)	
No	64 (87.7)	63 (62.7)	

Abbreviations: NIH=National Institutes of Health, PI=principal investigator, R1=research 1, R2=research 2.

associate professor, which was more commonly observed at private institutions that are not an HSC or have an R1 or R2 Carnegie Classification.

Unexpectedly, male chairs had a significantly higher publication output than female chairs, as well as a higher median number of total citations and *h*-index, although there were no differences in the number of publications per year or citations per publication. These findings could not be explained by faculty rank or school characteristics

and could be attributable to persistent gender biases in science, technology, engineering, and mathematics (STEM).[21,22] Importantly, we did find that female chairs had made progress in closing the gender gap observed in leadership positions.[23] We found female chairs hold only a slight minority of pharmacy practice chair positions, which is a significant improvement over 2003 when only 27% of pharmacy practice department chairs were female.[23] Nevertheless, there is still an underrepresentation of female pharmacy practice chairs given that there are nearly twice as many female pharmacy practice faculty members as male pharmacy practice faculty members according to data from AACP. Finally, reasons for the differences in scholarly productivity observed between male and female chairs could not be adequately explained, but certainly warrant further research to better understand why such differences exist.

Burghardt and colleagues[20] recently conducted a bibliometric study of faculty from the top 50 NIH-funded schools and colleges of pharmacy and reported a median h-index of 6 for clinical faculty according to both Scopus and Web of Science (WoS). Basic science faculty had a much higher median h-index of 22 and 21 according to Scopus and WoS, respectively, which is unsurprising given that basic science faculty spend more time conducting research and publishing. Interestingly, the median h-index for all pharmacy practice chairs in our study was 8, which is the same *h*-index reported by Burghardt and colleagues for all clinical faculty at the associate professor rank, which represented over a third of pharmacy practice chairs in our study. This could explain the modest h-index among pharmacy practice chairs as the h-index increases over time as citation counts grow and favor more senior faculty. Furthermore, individuals who accept chair
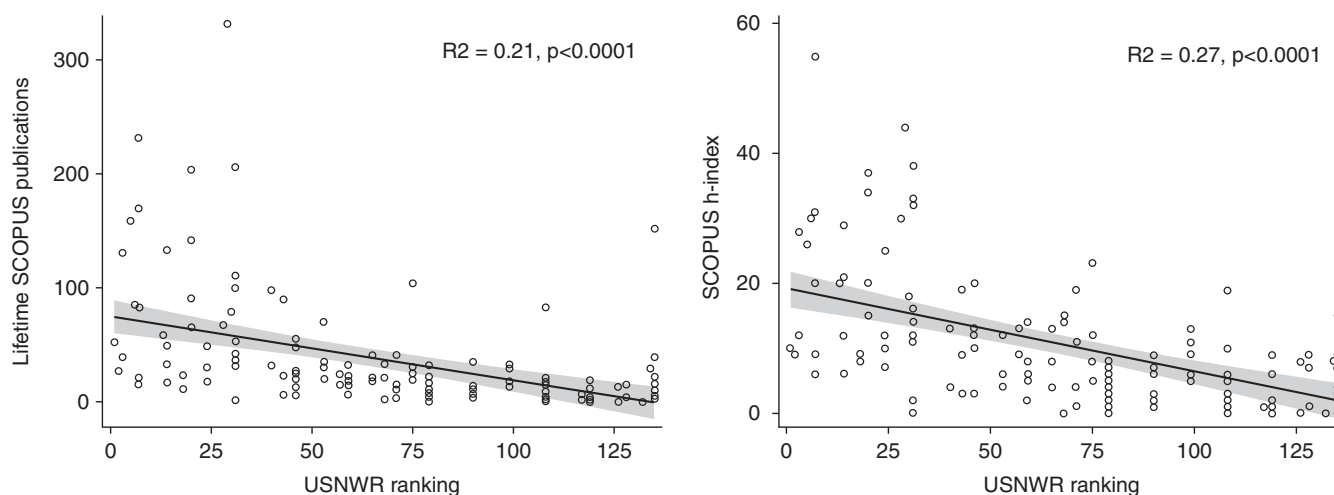
Figure 1. Correlation Between Number of Pharmacy Faculty Chair Publications and *US News & World Report* Ranking

positions often have less available time for research, which results in reduced scholarship productivity.[24]

This study had some limitations. First, we primarily referred to the AACP faculty directory to obtain our list of pharmacy practice chairs, and the directory may have contained errors and/or outdated information (eg, the status of recently appointed chairs may not have been updated yet in the directory). To address this limitation, we used the information available online for each school and college of pharmacy, as well as contacted the dean of the school when necessary to resolve discrepancies. Second, there are multiple bibliometric indices by which to measure scholarly productivity, including Google Scholar, Scopus, and WoS. Scopus was selected because it is considered to have the largest dataset of journals and fewer inconsistencies in content verification and quality compared to the other two.[25-28] Third, the cross-sectional approach only allowed for a snapshot of scholarly productivity. Furthermore, there were individual chair characteristics that we were unable to report because these data were not available for all chairs that may have impacted the interpretation of the results, such as tenure status, years of service as chair, receipt of funding from non-NIH sources, mix of duties and responsibilities, and previous background and training. Fourth, we did not ask the chair's themselves to identify their sex; however, we did use a validated database to determine sex and the median accuracy rate reported by Gender-API was 98%. Fifth, the heterogeneous nature of pharmacy practice departments and variation in scholarship expectations of chairs must be considered when interpreting the results of our research.

CONCLUSION

The scholarship productivity of pharmacy practice department chairs varies widely depending on institutional and individual characteristics. Chairs who were at institutions that were public, HSC-based schools, among the top 25 for NIH funding ranking, have an R1 Carnegie Classification, and a higher *USNWR* ranking also had higher publication metrics. Chairs who were male and at the rank of professor were found to have higher publication metrics compared to those who were female and at lower faculty ranks, respectively. Reasons for the differences associated with sex of pharmacy faculty members' sex remain unclear. Moreover, slightly less than half of pharmacy practice chairs are female, despite that female faculty account for two-thirds of all pharmacy practice faculty. Future research should explore the underrepresentation of female pharmacy practice chairs and factors that may contribute to their lower publication metrics.

REFERENCES

1. Thompson DF, Nahata MC. Pharmaceutical science faculty publication records at research-intensive pharmacy colleges and schools. *Am J Pharm Educ.* 2012;76(9):173. Doi:https://doi.org/10.5688/ajpe769173
2. Weathers T, Unni E. Publication rates of social and administrative sciences pharmacy faculty in non-research intensive pharmacy schools. *Am J Pharm Educ.* 2018;82(3):6229. Doi:https://doi.org/10.5688/ajpe6229
3. Nutescu EA, Engle JP, Bathija S, et al. Balance of academic responsibilities of clinical track pharmacy faculty in the United States: A survey of select American College of Clinical Pharmacy Practice and Research Network Members. *Pharmacotherapy.* 2014;34(12):1239–1249. Doi:https://doi.org/10.1002/phar.1521
4. Schimanski LA, Alperin JP. The evaluation of scholarship in academic promotion and tenure processes: past, present, and future. *F1000Res.* 2018;7. Doi:https://doi.org/10.12688/f1000research.16493.1
5. Schwinghammer TL, Rodriguez TE, Weinstein G, et al. AACP Strategy for addressing the professional development needs of department chairs. *Am J Pharm Educ.* 2012;76(6):S7. Doi:https://doi.org/10.5688/ajpe766S7
6. DeLander GE. Lessons from a recovering department chair. *Am J Pharm Educ.* 2017;81(3):43. Doi:https://doi.org/10.5688/ajpe81343
7. Dixon DL, Baker WL. Measuring research impact in the 21st century: are alternative metrics the answer? *Minerva Cardioangiol.* 2020;68(4):279–281. Doi:https://doi.org/10.23736/S0026-4725.20.05241-X
8. Medina MS, Draugalis JR. Exploring impact metrics beyond indices and citations for SOTL and applied educational research. *Am J Pharm Educ.* 2019;83(3):7211. Doi:https://doi.org/10.5688/ajpe7211
9. Hicks D, Wouters P, Waltman L, de Rijcke S, Rafols I. Bibliometrics: the Leiden Manifesto for research metrics. *Nature News.* 2015;520(7548):429. Doi:https://doi.org/10.1038/520429a
10. Thompson DF, Walker CK. A descriptive and historical review of bibliometrics with applications to medical sciences. *Pharmacotherapy.* 2015;35(6):551–559. Doi:https://doi.org/10.1002/phar.1586
11. Hirsch JE. An index to quantify an individual's scientific research output. *PNAS.* 2005;102(46):16569–16572. Doi:https://doi.org/10.1073/pnas.0507655102
12. Dixon DL, Baker WL. Short-term impact of Altmetric Attention Scores on citation counts in selected major pharmacy journals. *J Am Coll Clin Pharm.* 2020;3:10–14. Doi:https://doi.org/10.1002/jac5.1141
13. Bosso JA, Chisholm-Burns M, Nappi J, Gubbins PO, Ross LA. Benchmarking in academic pharmacy departments. *Am J Pharm Educ.* 2010;74(8):140. Doi:https://doi.org/10.5688/aj7408140
14. Santamaría L, Mihaljević H. Comparison and benchmark of name-to-gender inference services. *PeerJ Computer Science.* 2018;4:e156 https://doi.org/10.7717/peerj-cs.156
15. Wartman SA. *The Transformation of academic health centers: meeting the challenges of healthcare's changing landscape.* Amsterdam: Elsevier/Academic Press; 2015.
16. Thompson DF, Callen EC, Nahata MC. Publication metrics and record of pharmacy practice chairs. *Ann Pharmacother.* 2009;43(2):268–275. Doi:https://doi.org/10.1345/aph.1L400
17. Brown DL. Years of rampant expansion have imposed Darwinian survival-of-the-fittest conditions on US pharmacy schools. *Am J Pharm Educ.* 2020;84(10):8136. Doi:https://doi.org/10.5688/ajpe8136
18. Lee KC, El-Ibiary SY, Hudmon KS. Evaluation of research training and productivity among junior pharmacy practice faculty in the United States. *J Pharm Pract.* 2010;23(6):553–559. Doi:https://doi.org/10.1177/0897190010373657

19. Chisholm-Burns MA, Spivey C, Martin JR, Wyles C, Ehrman C, Schlesselman LS. A 5-year analysis of peer-reviewed journal article publications of pharmacy practice faculty members. *Am J Pharm Educ.* 2012;76(7):127. Doi:https://doi.org/10.5688/ajpe767127
20. Burghardt KJ, Howlett BH, Fern SM, Burghardt PR. A bibliometric analysis of the top 50 NIH-Funded colleges of pharmacy using two databases. *Res Social Adm Pharm.* 2020;16(7):941–948. Doi:https://doi.org/10.1016/j.sapharm.2019.10.006
21. Roper RL. Does gender bias still affect women in science? Microbiol *Mol Biol Rev.* 2019;83(3). Doi:10.1128/MMBR.00018-19
22. Casad BJ, Franks JE, Garasky CE, et al. Gender inequality in academia: problems and solutions for women faculty in STEM. *J Neurosci Res.* October 25, 2020. Doi:https://doi.org/10.1002/jnr.24631
23. Draugalis JR, Plaza CM, Taylor DA, Meyer SM. The status of women in US academic pharmacy. *Am J Pharm Educ.* 2014;78(10):178. Doi:https://doi.org/10.5688/ajpe7810178
24. Desselle SP, Peirce GL, Crabtree BL, et al. Pharmacy faculty workplace issues: findings from the 2009-2010 COD-COF Joint Task Force on Faculty Workforce. *Am J Pharm Educ.* 2011;75(4):63. Doi:https://doi.org/10.5688/ajpe75463
25. Bakkalbasi N, Bauer K, Glover J, Wang L. Three options for citation tracking: Google Scholar, Scopus and Web of Science. *Biomed Digit Libr.* 2006;3(1):7. Doi:https://doi.org/10.1186/1742-5581-3-7
26. Falagas ME, Pitsouni EI, Malietzis GA, Pappas G. Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and weaknesses. *FASEB j.* 2008;22(2):338–342. Doi:https://doi.org/10.1096/fj.07-9492LSF
27. S. Adriaanse L, Rensleigh C. Web of Science, Scopus and Google Scholar: a content comprehensiveness comparison. *The Electronic Library.* 2013;31(6):727–744. Doi:https://doi.org/10.1108/EL-12-2011-0174
28. Martín-Martín A, Orduna-Malea E, Thelwall M, Delgado López-Cózar E. Google Scholar, Web of Science, and Scopus: a systematic comparison of citations in 252 subject categories. *J Informetr.* 2018;12(4):1160–1177. Doi:https://doi.org/10.1016/j.joi.2018.09.002