

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Library Philosophy and Practice (e-journal)

Libraries at University of Nebraska-Lincoln

11-10-2020

Saudi Arabian Top Four Medical journals Bibliometric study

Manuelraj Peter

Imam Abdulrahman Bin Faisal University, mrpeter@iau.edu.sa

Spurgeon Anandraj Samuel

Imam Abdulrahman Bin Faisal University

Mohamed Idhris

Imam Abdulrahman Bin Faisal University, midhris@iau.edu.sa

Arun Vijay Subbarayalu

Imam Abdulrahman Bin Faisal University, ausubbarayalu@iau.edu.sa

Follow this and additional works at: <https://digitalcommons.unl.edu/libphilprac>



Part of the [Library and Information Science Commons](#)

Peter, Manuelraj; Anandraj Samuel, Spurgeon; Idhris, Mohamed; and Subbarayalu, Arun Vijay, "Saudi Arabian Top Four Medical journals Bibliometric study" (2020). *Library Philosophy and Practice (e-journal)*. 4492.

<https://digitalcommons.unl.edu/libphilprac/4492>

Saudi Arabian Top Four Medical journals Bibliometric study

Manuelraj Peter

Assistant Professor & Head of Library Systems, Deanship of Library Affairs, Imam Abdulrahman Bin Faisal University, Dammam, Kingdom of Saudi Arabia

Spurgeon Anandraj

Lecturer & Serials Control Librarian, Deanship of Library Affairs, Imam Abdulrahman Bin Faisal University, Dammam, Kingdom of Saudi Arabia

Mohamed Idhris

Assistant Professor, Central Library, Deanship of Library Affairs, Imam Abdulrahman Bin Faisal University, Dammam, Kingdom of Saudi Arabia

Arun Vijay Subbarayalu

Assistant Professor & Chairman, Quality Measurement & Evaluation Department, Deanship of Quality & Academic Accreditation, Imam Abdulrahman Bin Faisal University, Dammam.

ABSTRACT

Introduction: The purpose of this study was to measure the progress of scientific research outcomes of four medical journals, which are indexed to National Library of Medicine (USA) PubMed published from Saudi Arabia during the period from 2000 to 2019

Methods: Scientific papers that are published under the category of original and review articles, short communications, case, and short reports were downloaded from the top four medical journals indexed in the PubMed database viz. (i) Saudi Medical Journal (SMJ) (ii) Neurosciences (iii) Saudi Journal of Kidney Diseases and Transplantation (SJKDT) and (iv) The Annals of Saudi Medicine (ASM) and their research productivity is measured through an appropriate mapping process. The data were analyzed according to certain parameters such as the growth of publication, the types of publication, and the authorship pattern.

Inferences: The findings of the study revealed that 12866 articles were contributed by 47346 authors with an average of 3.67 authors per article, and 47.92% articles were published in 12 issues of SMJ (n=6165(47.92%)) , Neuroscience (n=1422, 11.05%), SJKDT (n=3160, 24.56%)and ASM (n=2119, 16.47%) during 2000–2019. Most of the articles (n=10774, 83.74%) included more than

one author, leaving only 2092 articles (16.26%) were published by single authors. The authors have collaborated with national and international authors for their scholarly work.

Conclusions: The analysis of bibliometric indicators of these four medical journals showed the rising tendency of research publications and the high rate of collaborative research output. These journals contributed a massive number of research papers during the period of the last twenty years. Collaboration among researchers facilitates sharing knowledge and techniques and brings a mixture of positive scientific thoughts. This study recommends that the unified bylaws for faculty in Saudi universities should give more weight to multi-authored papers.

Keywords: Bibliometrics; Medical Sciences; Research Productivity; Saudi Arabia.

Introduction

Bibliometric studies are regularly being used for research assessment and it involves the application of statistical methods to scientific publications to get bibliographic data for each country. Bibliometric analysis is a valuable tool to find information about the current state of research areas and permit researchers to identify and take on new lines of research. These methods are mostly quantitative and are also used to make assertions about qualitative pictures of scientific activities. Scientific progress is considered one of the most important indicators for both the community and the economic development of different countries. To measure and report scientific productivity, several well-known databases, such as Scopus, Web of Science, PubMed, and Google Scholar are available for indexing international publications in biomedical sciences. On exploration of those Saudi based journals indexed in PubMed, it is observed that four prominent medical journals are found and each one of them is described below:

Saudi Medical Journal is open access, a peer-reviewed, monthly publication launched in 1979 as per the initiative taken by His Royal Highness Prince Sultan Bin Abdul Aziz, Second Deputy Prime Minister of Defense and Aviation and Inspector-General, who plays a significant role in starting this Journal. Forty volumes have been published by this Journal since 1979. This Journal is a member of the Committee on Publication Ethics (COPE). SMJ is indexed in MEDLINE/Index Medicus (National Library of Medicine) available through PubMed, PubMed Central, Europe PubMed Central, PubMed Central Canada, SCOPUS, EMR Index Medicus,

Excerpta Medica Database (EMBASE), BIOBASE, and Thomson ISI in Science Citation Index Expanded online at ISI Web of Knowledge. The Saudi Medical Journal is playing a vital role to bridge the medical culture in the Middle East and in the West, where it is well-thought-out as a tool to understand the modules and quality of the medical profession together with the clinical approaches to manage medical problems in each respective area of study. Saudi Medical Journal will continue to be a symbol of national pride and an important medium for medical knowledge.

Neurosciences are open access, peer-reviewed, a quarterly publication. All those articles published are related to the nervous system, neurology, neurophysiology, neuroradiology, neurosurgery, neurorehabilitation, neuro-oncology, neuropsychiatry, and neurogenetics. The Neurosciences are indexed in PubMed, Scopus and Google Scholar.

Saudi Journal of Kidney Diseases and Transplantation (SJKDT), is the official publication of the Saudi Center for Organ Transplantation, Riyadh, Saudi Arabia which publishes six issues in a year and it is indexed in PubMed, Scopus and Google Scholar. This Journal publishes both original research articles and systematic review papers with a specific focus on kidney diseases, urinary tract, renal replacement therapies, and transplantation. The journal also publishes papers related to cell therapy and islet transplantation, clinical transplantation, experimental transplantation, immunobiology and genomics and xenotransplantation related to the kidney. Besides, short communications, case studies, letters to the editors, an annotated bibliography and a column on news and views are also published.

The Annals of Saudi Medicine (ASM) is a bimonthly journal published by King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia. It publishes scientific reports of clinical interest in English and all submissions are subject to peer review by the editorial board and specialist reviewers. Even though manuscripts from any part of the world are welcome by this journal, specific importance is given to those studies from the Middle East or other parts of Asia and Africa regions. The ASM is indexed in PubMed, PMC, Web of Science, EMBASE, Scopus and Google Scholar.

The researchers carried out a thorough study on the scope, nature, and type of articles published in the above four PubMed journals during the year 2000-2019 to address the following 6 key objectives of this study viz.

1. To study the Journal wise Publications Distribution

2. To study the Year and Journal wise Distribution of Articles
3. To study the Year and Journal wise total Author Productivity
4. To study the Year wise Author Collaboration for All Journals
5. To examine the Degree of Collaboration
6. To identify Author Ranking about four prominent medical journals published from Saudi Arabia viz. (i) Annals of Saudi Medicine; (ii) Neurosciences (Riyadh); (iii) Saudi Journal of Kidney Diseases and Transplantation and (iv) Saudi Medical Journal

Methodology

Study Design: A retrospective-analytical study design was adopted to ascertain the progress of scientific research outcomes of four PubMed medical journals originating from Saudi Arabia. To execute this research work, the PubMed database was searched to retrieve publications belonging to the above four Saudi medical journals as a measure to study its research productivity. For this study, the search criteria have been limited to publications from 2000-2019. i.e. 19 years. These journal publications are downloaded and analyzed separately. Specifically, those scientific papers published under the category of 'original and review articles', 'short communications', 'case studies' and 'short reports' in these journals were downloaded from the PubMed database. The data were analyzed according to parameters, the growth of publication, the types of publication, and the authorship pattern.

A total of 12866 publications were retrieved for PubMed database in which 2119 publications belonging to Annals of Saudi Medicine, 1422 publications from Neurosciences (Riyadh), 3160 publications from Saudi Journal of Kidney Diseases and Transplantation, and 6165 publications from Saudi Medical Journal was download and analyzed using Microsoft Excel.

Results

Journal wise Publication Distribution

It is observed that a total of 12866 articles had been published during the year 2000-2019. A maximum number of articles were published by the Saudi Medical journal (n=6165) and this journal has a publishing frequency of twelve issues per year. The least number of articles were published in the Journal of Neurosciences (n=1422) which has the publication frequency of four (4) issues per year.

Table. 1 Journal wise Publications Distribution

Journal	Frequenc		2000-2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Grand Total
Annals of Saudi Medicine	6	Vol	20-30	31	32	33	34	35	36	37	38	39	2119(16.47%)
		Issues	1267	137	126	133	107	80	74	70	64	61	
Neurosciences (Riyadh)	4	Vol	05--15	16	17	18	19	20	21	22	23	24	1422(11.05%)
		Issues	816	83	77	74	65	69	70	54	60	54	
Saudi Jrl of Kidney Diseases and Transp	6	Vol	11--21	22	23	24	25	26	27	28	29	30	3160(24.56%)
		Issues	1119	236	227	232	237	222	224	222	227	214	
Saudi Medical Journal	12	Vol	21--31	32	33	34	35	36	37	38	39	40	6165(47.92%)
		Issues	4142	253	229	199	259	265	235	196	196	191	
Total													12866(100)

Journal wise publication distribution of article regarding a year

The researchers further attempted to explore how the publication distribution of each one of the four identified journals spread from the year 2000 to 2019.

Table.2 Year and Journal wise Distribution of Articles

Year	Ann Saudi Med		Neurosciences (Riyadh)		Saudi J Kidney Dis Transpl		Saudi Med J		Grand Total	
	Pub	%	Pub	%	Pub	%	Pub	%	Pub	%
2000	145	6.85	57	4.01	60	1.90	279	4.51	541	4.20
2001	100	4.73	46	3.23	53	1.68	245	3.96	444	3.44
2002	116	5.48	64	4.5	62	1.96	340	5.49	582	4.52
2003	118	5.58	58	4.08	67	2.12	367	5.93	610	4.73
2004	127	6	64	4.5	59	1.87	513	8.28	763	5.92
2005	119	5.62	74	5.2	63	1.99	489	7.90	745	5.78
2006	122	5.77	81	5.7	86	2.72	480	7.75	769	5.97
2007	99	4.68	88	6.19	98	3.10	447	7.22	732	5.68

2008	111	5.25	110	7.74	167	5.28	398	6.43	786	6.10
2009	106	5.01	100	7.03	187	5.92	330	5.33	723	5.61
2010	104	4.91	74	5.2	217	6.87	281	4.54	676	5.24
2011	137	6.47	83	5.84	236	7.47	253	4.09	709	5.50
2012	126	5.95	77	5.41	227	7.18	229	3.70	659	5.11
2013	133	6.29	74	5.2	232	7.34	199	3.21	638	4.95
2014	107	5.06	65	4.57	237	7.50	259	4.18	668	5.18
2015	80	3.78	69	4.85	222	7.03	265	4.28	636	4.93
2016	74	3.5	70	4.92	224	7.09	235	3.80	603	4.68
2017	70	3.31	54	3.8	222	7.03	196	3.17	542	4.20
2018	64	3.02	60	4.22	227	7.18	196	3.17	547	4.24
2019	61	2.88	54	3.8	214	6.77	191	3.08	520	4.03
Grand Total	2119		1422		3160		6192		12893	
	16.83%		10.04%		28.12%		45.01%		100	

The Year and Journal wise distribution of articles is arranged in table 2, which shows the highest number of articles i.e., 6192 (45.01 %) were published in the Saudi Medical Journal during the years 2000-2019. The minimum number of articles (n=1422, 10.04%) was published in Neurosciences (Riyadh) journal. While ascertaining the number of publications made by these journals since the year 2000, it is observed that a maximum number of articles were published in the year 2008 (n=786, 6.10%). Specifically, Annals of Saudi Medicine published 145 (6.85%) articles in the year of 2000 and Neurosciences (Riyadh) journal published 110 (7.74%) articles in the year 2008. Likewise, the Saudi Journal of Kidney Diseases & Transplantation journal published a maximum number of articles in the year 2011 and it had produced 236 articles (7.47%) and Saudi Medical Journal published the maximum number of articles (n=513, 8.28%) in the year 2014.

Journal wise Authors' Productivity Regarding Year

The next research objective addressed is the productivity of authors and is measured through the number of authors contributed to all the identified journals during the period between 2000 and 2019.

Table.3 Year and Journal-wise total Author Productivity

Year	Ann Saudi Med		Neurosciences (Riyadh)		Saudi J Kidney Dis Transpl		Saudi Med J		Grand Total	
	Author Prod	%	Author Prod	%	Author Prod	%	Author Prod	%	Author Prod	%
2000	396	4.97	149	3.13	194	1.46	691	3.24	1430	3.02
2001	292	3.67	120	2.52	203	1.52	659	3.09	1274	2.69
2002	332	4.17	181	3.81	197	1.48	970	4.55	1680	3.55
2003	375	4.71	172	3.62	225	1.69	1045	4.90	1817	3.84
2004	404	5.07	163	3.43	188	1.41	1497	7.02	2252	4.76
2005	387	4.86	214	4.50	190	1.43	1661	7.79	2452	5.18
2006	420	5.27	275	5.78	237	1.78	1767	8.29	2699	5.70
2007	331	4.16	315	6.63	354	2.66	1625	7.63	2625	5.54
2008	370	4.64	381	8.01	685	5.14	1496	7.02	2932	6.19
2009	389	4.88	341	7.17	700	5.26	1153	5.41	2583	5.46
2010	384	4.82	217	4.56	923	6.93	963	4.52	2487	5.25
2011	486	6.10	305	6.42	1060	7.96	843	3.96	2694	5.69
2012	539	6.77	229	4.82	916	6.88	800	3.75	2484	5.25
2013	569	7.14	263	5.53	1026	7.71	734	3.44	2592	5.47
2014	517	6.49	202	4.25	982	7.38	1020	4.79	2721	5.75
2015	432	5.42	249	5.24	1043	7.83	990	4.65	2714	5.73
2016	337	4.23	238	5.01	973	7.31	952	4.47	2500	5.28
2017	339	4.26	224	4.71	1073	8.06	866	4.06	2502	5.28
2018	304	3.82	273	5.74	1133	8.51	777	3.65	2487	5.25
2019	363	4.56	243	5.11	1013	7.61	802	3.76	2421	5.11
Total	7966		4754		13315		21311		47346	100
	16.83%		10.04%		28.12%		45.01%		100	

Table 3 indicates the year and Journal wise total Author Productivity and it is observed that a total of 12866 articles were contributed by 47346 authors with an average of 3.67 authors per article. While observing author contributions during the years from 2000 to 2019, it is revealed that the highest number of authors contributed to identified journals in the year 2008 (n=2932, 6.19%). The Saudi Medical Journal holds the maximum number of authors (n=21311, 45.01%) and the year 2006 tops the list with more authors contributions (n=1767, 8.29%). The second-highest number of authors contributed to the Saudi Journal of Kidney Diseases and Transplantation (n=13315, 28.12%) and the year 2018 tops the list with more author's contributions (n=1133,

8.51%). During these eighteen years, the lowest number of authors is observed in the journal of Neurosciences (Riyadh) (n=4754, 10.04%).

Year-wise Author Collaboration Pattern Observed in the Identified Journals

The table 4 shows the details about the degree of collaboration held by the authors in publishing their articles from the year 2000 to 2019. Earlier studies have demonstrated that the degree of collaboration is regarded as a quality indicator to develop and disseminate scientific knowledge to newly developing countries (Manuelraj Peter et al, 2019; Freshwater et al. 2007; Kim, 2006)

Table 4. Year-wise for All Journals

Year	1 Author	2 Author	3 Author	4 Author	5 and Above	Total	%
2000	176	262	300	240	452	1430	3.02
2001	118	234	219	248	455	1274	2.69
2002	149	312	264	340	615	1680	3.55
2003	155	270	300	396	696	1817	3.84
2004	183	340	381	512	836	2252	4.76
2005	149	274	372	632	1025	2452	5.18
2006	145	268	369	552	1365	2699	5.70
2007	125	284	357	496	1363	2625	5.54
2008	147	238	426	492	1629	2932	6.19
2009	110	298	372	468	1335	2583	5.46
2010	113	206	321	568	1279	2487	5.25
2011	133	192	342	572	1455	2694	5.69
2012	115	218	309	480	1362	2484	5.25
2013	95	178	297	484	1538	2592	5.47
2014	101	188	309	504	1619	2721	5.75
2015	86	156	240	496	1736	2714	5.73
2016	75	166	321	424	1514	2500	5.28
2017	47	140	213	408	1694	2502	5.28
2018	55	162	204	336	1730	2487	5.25
2019	60	154	183	348	1676	2421	5.11
	2337	4540	6099	8996	25374	47346	100.00
	4.94%	9.59%	12.88%	19.00%	53.59%	100.00	

Table No.4 shows the year wise authorship pattern of publications made in the year 2000 to 2019. It shows the year-wise distribution of authorship pattern whether single author or joint authorship, consisting of two authors, three authors, four authors, up to five-plus authorship

patterns. As per the result depicted in Table 4, 2008 is the highest number of authors contributed papers (n=2932, 6.19%). While studying the authorship pattern, the four authors' collaboration is the most influential and maximum number of articles published under this category was observed to be 8996 (19.00%) and it is followed by a group of three authors where a total of 6099 (12.88%) articles were published since 2000. It is interesting to note that 9.59% (n=4540) of total publication was made by two author collaborations and a total of 25374 (53.59%) research articles come from the group of five and above authors.

Degree of Collaboration held by authors from 2000 to 2019.

The term 'research collaboration' could be defined as the working together of researchers to achieve the common goal of producing new scientific knowledge (J. Sylvan Katz, Ben R. Martin, 1997). The increasingly complex interdisciplinary and costly characteristics of modern science encourage researchers to get involved in collaborative research (SooHo Lee and Barry Bozeman, 2005).

Table.5 Degree of Collaboration.

Year	Single Author (Ns)	Multi Author (Nm)	Total (Nm+Ns)	Degree of Collaboration
2000	176	1254	1430	0.88
2001	118	1156	1274	0.98
2002	149	1531	1680	0.75
2003	155	1662	1817	0.69
2004	183	2069	2252	0.56
2005	149	2303	2452	0.51
2006	145	2554	2699	0.46
2007	125	2500	2625	0.48
2008	147	2785	2932	0.43
2009	110	2473	2583	0.49
2010	113	2374	2487	0.50
2011	133	2561	2694	0.47
2012	115	2369	2484	0.50
2013	95	2497	2592	0.48
2014	101	2620	2721	0.46
2015	86	2628	2714	0.46
2016	75	2425	2500	0.50
2017	47	2455	2502	0.50
2018	55	2432	2487	0.50

2019	60	2361	2421	0.52
Grand Total	2337	45009	47346	0.95

The table shows the details about the degree of collaboration. Degree of collaboration is a prominent area of research in bibliometric studies which indicate trends in single and joint authorship during 2000 to 2019. The degree of collaboration is defined as the ratio of the number of collaborative research papers to the total number of research papers in the discipline during a certain period. The formula suggested by Subramanyam is used in this study.

$$C = \frac{Nm}{Nm + Ns}$$

C = Degree of Collaboration Nm = Number of Multiple authors Ns = Number of single authors

$$\frac{45009}{45009 + 2337}$$

C=0.95

It is observed that from the year 2000 to 2019, the degree of collaboration was very high with 0.95.

Conclusion

This research is the first of its kind to study the research productivity of medical journals based on the mapping of 12866 research papers published between the year 2000 to 2019 as reflected in the PubMed online database which is one of the most comprehensive databases in the medical sciences. The study reveals various aspects of Bibliometric components like year-wise distribution, authorship pattern, Year and Journal-wise total Author Productivity, Degree of Collaboration. The following conclusions are made from the above analysis and discussions.

A maximum number of articles were published in Saudi Medical journal during the period of 2000-2019 (n=6165) and one of the main reasons for this large volume of publication is its frequency where it produces 12 issues per year. The average number of authors per paper is 3.67 for all journals. Compared to the Annals of Saudi Medicine and Saudi Journal of Kidney Diseases and Transplantation, The Saudi journal of kidney diseases and transplantation has the highest percentage of publication with the same frequency. After taking into consideration the total contribution of authors to the top four medical journals, the highest number of authors (45.01%) have chosen and published their articles in Saudi Medical Journal between the year 2000 to 2019. 2008 shows the highest number of contributions of 2935(6.52%) for all journals.

The findings of this study will lead to a better understanding of the current and future status of medical journals in Saudi Arabia. Furthermore, the results of the study will aid health policymakers and people in academia to shape up medically related research in the next decade. Also, the momentum of research activity needs to be maintained through continuous analysis of publications from researchers in the region to provide feedback to academics, health institutions, and education planners.

Limitations

- The researchers have included only those PubMed indexed medical journals operating from Saudi Arabia in the mapping process and the observed findings cannot be generalized.
- This study addressed the research productivity of medical journals based on six key parameters such as 'year-wise distribution', 'authorship pattern', 'Year and Journal-wise total Author Productivity', 'Degree of Collaboration'. The impact factor of these journals was ignored during this ranking process and it is considered as a limitation to be addressed in future studies.
- Since the study is analytical, reasons for the difference in performance/productivity among the medical journals could not be explained and further study is warranted.

References

Nurses' Research Capacity, Use of Evidence, and Research Productivity in Acute Care: Year 1 Findings from a Partnership Study. (2016). *J Nurs Adm*, 46(10 Suppl), S43-S48. doi:10.1097/01.NNA.0000499767.23899.c8

Research Productivity and Rankings of Anesthesiology Departments in Canada and the United States: The Relationship Between the h-Index and Other Common Metrics: Retraction Notice. (2018). *Anesth Analg*, 126(5), e1. doi:10.1213/ANE.0000000000002915

Alhamid, N., Almounayer, N., Alsabbagh, B., & Atassi, B. (2015). Case reports and research productivity among Syrian medical students: Review, reality, and suggested solutions. *Avicenna J Med*, 5(4), 101-105. doi:10.4103/2231-0770.165119

Alweis, R., Wenderoth, S., & Donato, A. (2015). Effectiveness of iterative interventions to increase research productivity in one residency program. *J Community Hosp Intern Med Perspect*, 5(6), 29203. doi:10.3402/jchimp.v5.29203

Amory, J. K., Louden, D. K. N., McKinney, C., Rich, J., Long-Genovese, S., & Disis, M. L. (2017). Scholarly productivity and professional advancement of junior researchers receiving KL2, K23, or K08 awards at a large public research institution. *J Clin Transl Sci*, 1(2), 140-143. doi:10.1017/cts.2016.22

April, M. D., April, C. W., Schauer, S. G., Maddry, J. K., Sessions, D. J., Davis, W. T., . . . Delorenzo, R. A. (2016). Optimizing Military Human Subjects Protection and Research Productivity: The Role of Institutional Memory. *Am J Bioeth*, 16(8), 43-45. doi:10.1080/15265161.2016.1187222

Argiles, J. M. (2016). The assessment of productivity in biomedical research. *Ann Med*, 48(8), 631-633. doi:10.1080/07853890.2016.1205213

Atassi, B. (2016). Comments on: "Case reports and research productivity among Syrian medical students: Review, reality, and suggested solutions". *Avicenna J Med*, 6(2), 61-63. doi:10.4103/2231-0770.179555

Baines, D., Bates, I., Bader, L., Hale, C., & Schneider, P. (2018). Conceptualising production, productivity and technology in pharmacy practice: a novel framework for policy, education and research. *Hum Resour Health*, 16(1), 51. doi:10.1186/s12960-018-0317-5

Boddapati, V., Sachdev, R., Fu, M. C., Camp, C. L., Marx, R. G., & Dines, J. S. (2018). Increasing Industry Support Is Associated with Higher Research Productivity in Orthopaedic Surgery. *J Bone Joint Surg Am*, 100(6), e36. doi:10.2106/JBJS.17.00910

Brackmann, M., Reynolds, R. K., Uppal, S., & McLean, K. (2016). Association of a Biweekly Research Workgroup With Enhanced Resident Research Productivity. *Obstet Gynecol*, 128(3), 617-620. doi:10.1097/AOG.0000000000001574

Bunting, A. C., Alavifard, S., Walker, B., Miller, D. R., Ramsay, T., & Boet, S. (2018). Research Productivity and Rankings of Anesthesiology Departments in Canada and the United States: The Relationship Between the h-Index and Other Common Metrics [RETRACTED]. *Anesth Analg*. doi:10.1213/ANE.0000000000002508

- Carney, M. J., Weissler, J. M., Koltz, P. F., Fischer, J. P., Wu, L. C., & Serletti, J. M. (2017). Academic Productivity, Knowledge, and Education in Plastic Surgery: The Benefit of the Clinical Research Fellow. *Plast Reconstr Surg*, 140(4), 842-849. doi:10.1097/PRS.0000000000003681
- Catal, B., Akman, Y. E., Sukur, E., & Azboy, I. (2018). Worldwide arthroplasty research productivity and contribution of Turkey. *Acta Orthop Traumatol Turc*, 52(5), 376-381. doi:10.1016/j.aott.2018.06.002
- Chauvin, S., Mulsant, B. H., Sockalingam, S., Stergiopoulos, V., Taylor, V. H., & Vigod, S. N. (2019). Gender Differences in Research Productivity among Academic Psychiatrists in Canada. *Can J Psychiatry*, 706743718802798. doi:10.1177/0706743718802798
- Chen, S. Y., & Wu, J. T. (2017). Global productivity of dermatological research: a bibliometric analysis from 1985 to 2014. *Br J Dermatol*, 176(1), 234-236. doi:10.1111/bjd.14802
- Chiari, B. M., Grossi, D. B., Fernandes, F. D., Ferreira, L. P., Mello, M. T., Hallal, P. C., & Fonseca, S. T. (2016). Research productivity grants: Physical Education, Physical Therapy, Speech Pathology, and Occupational Therapy. *Braz J Phys Ther*, 20(1), 1-3. doi:10.1590/bjpt-rbf.2014.0150
- Chiari, B. M., Grossi, D. B., Fernandes, F. D., Ferreira, L. P., Mello, M. T., Hallal, P. R., & Fonseca, S. T. (2015). Productivity Fellowships for Research: Physical Education, Physical Therapy, Speech Language Pathology and Audiology and Occupational Therapy. *Codas*, 27(6), 511-513. doi:10.1590/2317-1782/20152276
- Chiari, P., Forni, C., Zeneli, A., Gianesini, G., Zanin, R., Braglia, L., . . . Guberti, M. (2016). Evaluation of the impact of support for nursing research on scientific productivity in seven Italian hospitals: A multiple interrupted time series study. *Nurse Educ Today*, 40, 1-6. doi:10.1016/j.nedt.2016.02.005
- Choi, J., You, J. S., Joo, Y. S., Kong, T., Ko, D. R., & Chung, S. P. (2016). A bibliometric analysis of research productivity of emergency medicine researchers in South Korea. *Clin Exp Emerg Med*, 3(4), 245-251. doi:10.15441/ceem.16.150
- Cogswell, P. M., Deitte, L. A., Donnelly, E. F., Morgan, V. L., & Omary, R. A. (2018). Attitudes of Radiology Program Directors Toward MD-PhD Trainees, Resident Research Productivity, and Dedicated Research Time. *Acad Radiol*, 25(6), 733-738. doi:10.1016/j.acra.2018.01.029
- Conroy, M. B., Shaffiey, S., Jones, S., Hackam, D. J., Sowa, G., Winger, D. G., . . . Levine, A. S. (2018). Scholarly Research Projects Benefit Medical Students' Research Productivity and Residency Choice: Outcomes From the University of Pittsburgh School of Medicine. *Acad Med*, 93(11), 1727-1731. doi:10.1097/ACM.0000000000002328
- Cvetanovich, G. L., Saltzman, B. M., Chalmers, P. N., Frank, R. M., Cole, B. J., & Bach, B. R., Jr. (2016). Research Productivity of Sports Medicine Fellowship Faculty. *Orthop J Sports Med*, 4(12), 2325967116679393. doi:10.1177/2325967116679393

- DeFroda, S. F., Shah, K. N., Safdar, O., & Mulcahey, M. K. (2018). Trends in research productivity of residents applying for orthopedic sports medicine fellowship. *Phys Sportsmed*, 46(1), 61-65. doi:10.1080/00913847.2018.1411170
- Diaz, I., Cortey, M., Olvera, A., & Segales, J. (2016). Use of H-Index and Other Bibliometric Indicators to Evaluate Research Productivity Outcome on Swine Diseases. *PLoS One*, 11(3), e0149690. doi:10.1371/journal.pone.0149690
- Dickson, T., Chen, P. D., & Taylor, B. (2018). Impact of funding allocation on physical therapist research productivity and DPT student graduates: an analysis using panel data. *Adv Health Sci Educ Theory Pract*. doi:10.1007/s10459-018-9864-8
- Ekeroma, A. J., Shulruf, B., McCowan, L., Hill, A. G., & Kenealy, T. (2016). Development and use of a research productivity assessment tool for clinicians in low-resource settings in the Pacific Islands: a Delphi study. *Health Res Policy Syst*, 14, 9. doi:10.1186/s12961-016-0077-4
- El Rassi, R., Meho, L. I., Nahlawi, A., Salameh, J. S., Bazarbachi, A., & Akl, E. A. (2018). Medical research productivity in the Arab countries: 2007-2016 bibliometric analysis. *J Glob Health*, 8(2), 020411. doi:10.7189/jogh.08.020411
- Fan, G., Han, R., Zhang, H., He, S., & Chen, Z. (2017). Worldwide Research Productivity in the Field of Minimally Invasive Spine Surgery: A 20-year Survey of Publication Activities. *Spine (Phila Pa 1976)*, 42(22), 1717-1722. doi:10.1097/BRS.0000000000001393
- Farrokhyar, F., Bianco, D., Dao, D., Ghert, M., Andruszkiewicz, N., Sussman, J., & Ginsberg, J. S. (2016). Impact of research investment on scientific productivity of junior researchers. *Transl Behav Med*, 6(4), 659-668. doi:10.1007/s13142-015-0361-9
- Felder, T. M., Braun, K. L., Wigfall, L., Sevoyan, M., Vyas, S., Khan, S., . . . Hebert, J. R. (2018). Mentoring, Training, and Scholarly Productivity Experiences of Cancer-Related Health Disparities Research Trainees: Do Outcomes Differ for Underrepresented Scientists? *J Cancer Educ*. doi:10.1007/s13187-018-1322-z
- Forero, D. A., & Moore, J. H. (2016). Considerations for higher efficiency and productivity in research activities. *BioData Min*, 9, 35. doi:10.1186/s13040-016-0115-3
- Fowler, A. J., Al Omran, Y., Pidgeon, T. E., Jafree, D. J., & Agha, R. A. (2016). Response to: Surgical trainee research collaboratives in the UK: An observational study of research activity and publication productivity. *Int J Surg*, 33 Pt A, 133-135. doi:10.1016/j.ijssu.2016.07.010
- Friedman, Y., & Sills, M. (2015). Collaboration: a Simple Recipe for Improving Research Productivity in the Community Teaching Hospital Setting. *J Hosp Librariansh*, 15(4), 373-385. doi:10.1080/15323269.2015.1079688

- Gimenez, N., Caro, C., Ponsa, E., Perez Ortiz, A. M., Navazo, I., & Gavagnach, M. (2017). Rising to the Challenge of promoting research in primary care and nursing: Research productivity and professional view. *Enferm Clin*, 27(3), 144-152. doi:10.1016/j.enfcli.2017.03.008
- Gomez Ochoa, S. A., & Espin Chico, B. B. (2018). Bibliometric Analysis of Research Productivity in Latent Tuberculosis: Are We Focusing Our Research Efforts on the Right Areas? *Tuberc Respir Dis (Seoul)*, 81(2), 163-165. doi:10.4046/trd.2017.0109
- Guraya, S. Y., Khoshhal, K. I., Yusoff, M. S. B., & Khan, M. A. (2018). Why research productivity of medical faculty declines after attaining professor rank? A multi-center study from Saudi Arabia, Malaysia and Pakistan. *Med Teach*, 40(sup1), S83-S89. doi:10.1080/0142159X.2018.1465532
- Hafsteinsdottir, T. B., van der Zwaag, A. M., & Schuurmans, M. J. (2017). Leadership mentoring in nursing research, career development and scholarly productivity: A systematic review. *Int J Nurs Stud*, 75, 21-34. doi:10.1016/j.ijnurstu.2017.07.004
- Haggerty, T., Cole, A. M., Xiang, J., Mainous, A. G., 3rd, & Seehusen, D. (2017). Family Medicine-Specific Practice-Based Research Network Productivity and Clinical and Translational Sciences Award Program Affiliation. *South Med J*, 110(4), 287-292. doi:10.14423/SMJ.0000000000000631
- Hamer, G. L. (2016). Heterogeneity of Mosquito (Diptera: Culicidae) Control Community Size, Research Productivity, and Arboviral Diseases Across the United States. *J Med Entomol*, 53(3), 485-495. doi:10.1093/jme/tjw020
- Havnaer, A. G., Chen, A. J., & Greenberg, P. B. (2017). Scholarly concentration programs and medical student research productivity: a systematic review. *Perspect Med Educ*, 6(4), 216-226. doi:10.1007/s40037-017-0328-2
- Henderson, K. M. (2015). REMOVED: Reproducibility in science: How video journals increase research validity and productivity. *Int J Dev Neurosci*, 47(Pt A), 2. doi:10.1016/j.ijdevneu.2015.04.014
- Hoonpongsimanont, W., Sahota, P. K., Ng, N. N., Farooqui, M. J., Chakravarthy, B., Patel, B., & Lotfipour, S. (2017). Research Associates Program: Expanding clinical research productivity with undergraduate students. *SAGE Open Med*, 5, 2050312117730245. doi:10.1177/2050312117730245
- Hu, J., Gholami, A., Stone, N., Bartoszko, J., & Thoma, A. (2018). An Evaluation of h-Index as a Measure of Research Productivity Among Canadian Academic Plastic Surgeons. *Plast Surg (Oakv)*, 26(1), 5-10. doi:10.1177/2292550317749508