University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Library Philosophy and Practice (e-journal)   **Libraries at University of Nebraska-Lincoln**

10-10-2020

Authorship Trends and Collaboration Pattern in the Neuroscience Literature in India during the year 1989-2018: A Scientometric Study

Raghavan B K
National Institute of Public Cooperation and Child Development, raghavan.b.k@gmail.com

Authorship Trends and Collaboration Pattern in the Neuroscience Literature in India during the year 1989-2018: A Scientometric Study

Author details and their Affiliations

Dr. Keshava
Professor & Director of PMEB
Department of Studies and Research in Library and Information Science
Tumkur University, Tumakuru

Correspondence Author

Mr. Raghavan. B. K
Assistant Librarian
National Institute of Public Cooperation and Child Development
Ministry of Women and Child Development
Government of India
Regional Centre, Bengaluru
raghavan.b.k@gmail.com
8660224400

Authorship Trends and Collaboration Pattern in the Neuroscience Literature in India during the year 1989-2018: A Scientometric Study

Abstract:

Background: The present paper analyses authorships trends and pattern of authorship in the field the of neuroscience

Objectives: The main objective of the study is to identify neuroscience publication form type, year wise distribution, Authorship pattern, to known the Measure of collaboration it will provide Collaborative Index (CI), Degree of Collaboration (DC), Collaboration Coefficient (CC) and Modified Collaborative Coefficient (MCC), to know the most prolific Authors in Neuroscience in India and top 20 journals and their rank based on the publication and India Collaborative with other Countries

Materials and Methods: The PubMed database has been used for obtaining required the data in the field of Neuroscience during 30 years (1989-2018) and retrieved data by using these keywords "Affective neuroscience, Behavioural neuroscience, Cellular neuroscience, Clinical neuroscience, Cognitive neuroscience, Developmental neuroscience, Molecular neuroscience, Neuroimaging, Neuro physiology, Neurology in the combined Title, Abstract and Keywords field.

Results: A total of 13580 articles were extracted from PubMed database. Most of the publication mode opted by the author/researcher is Journals published 40.19% of total publications. Out of 13580 articles, 1810(13.33%) articles were published in 2017. Out of 100, 94.17% of articles were contributed by collaborative authors. The Mean of CI, DC, CC and MCC is 0.20, 0.99,0.20 and 0.80 respectively. Mishra U K who published 302 stood first rank.

Neurology in India has in the top ranked with 11.92% of publications (1619) and USA the largest share (42.24%) of international collaboratives publication with India.

Introduction:

Authorship pattern varies from one subject field to another. Authorship studies provide helpful information concerning types of authors, collaborative work, assessing research activities, among others[1]. Some specific areas in studying authorship are discovering changing patterns around authorship, frequency[2]. Neuroscience is one of the quickest growing areas of biomedical research. Neuroscience is the study of the nervous system and it is a branch of biology[3]. Neuroscience research covers a wide range of disciplines, with many different subfields such as psychology, genetics, computer science, engineering, linguistics, chemistry, mathematics, medicine, allied disciplines including philosophy and physics[4]. The present study is made attempt to quantify the authorship trend and collaboration pattern in the Neuroscience literature by assessing the PubMed Database.

Review of Literature:

In the topical years, many specialists have been conducted Scientometric studies in different subject fields. The following research studies are related to the objectives of this study have been reviewed.

Mohammed Shahabuddin, Sheikh (2013)[1] has mapped Neuroscience research in India for the period of 1992–2005, papers are authored by 1 to 27 authors; multi-author papers are better cited. Collaborative research articles were studied, papers are indexed in NSCI only and not PubMed. Indian authors collaborative work with international organization is only 12% papers

and indexed in NSCI with authors from 75 different other countries –most of from G7 nations and the internationalization index is 16.14.

Raja, S (2012)[2] has identify the authorship patter, publication type and secondary journal coverage in the multidisciplinary subject of space neuroscience and 486 articles were published during 1999-2012. The greatest number of publications (70) was published in the year 2010. The most productive authors are Rabinovich MI and Spence C they published 1.2% of all papers published in this research field. The highest productivity of publication is given by USA 199 (39.9%).

Bala, A and Gupta, BM (2010)[3] has analyses the neurosciences research output in India in during the period 19992008 and the analyses comprised research growth, rank, global publications, collaborative papers with international and major joint countries and most of researchers are choose publish their research work in journal. It also analysed highly productive authors, institutions and cited papers. The mean of annual publication growth rate was 11.37%, collaborative author with papers is 17.34.

Scope and Limitation of the Study

The scope of the study is to discover authorship pattern, trend of authorship trend and collaboration pattern in the field of Neuroscience literature output in India and the present study is based on articles in journals, books and papers printed in the conference proceedings published on the Neuroscience subject from 1989 to 2018. This study is limited to30 years.

Objectives of The Study

The main objective of this study is to analyse the Indian research output in Neuroscience publications a during 1989-2018 has following:

- o To know the Authorship pattern

- To study of Measure of collaboration provided by Collaborative Index (CI), Degree of Collaboration (DC), Collaboration Coefficient (CC) and Modified Collaborative Coefficient (MCC).

- To examine most prolific Authors in Neuroscience publications in India

- To find out the Top 20 journals and their rank

- To study the India Collaborative with other Countries

Methodology

This study focused on the Scientometric analysis of research publications in Neuroscience literature output in India, the data extracted from PubMed database. PubMed contains over 24 million citations for biomedical literature from MEDLINE, life science e-books and journals. Documents may include links to full-text content from PubMed Central and publisher websites. The period of this study is restricted 1989 to 2018. The analysis of data is related to the Statistical analysis with respect to forms of literature, authorship pattern, measures of collaboration in research output of neuroscience country wise research output.

Analysis & Discussions

All retrieved records from PubMed database in the field of Neuroscience during the year 1989 to 2018 have been processed. The total number of records were 13580 with an average publication per year as 452.67.

Table 1 Forms of Literature

Forms of Literature	No. of Publication	% of Publication
Journals	5458	40.19
Case Repots	2278	16.77
Letter	255	1.88
Comparative Study	246	1.81
Clinical Trail	133	0.98
Editorial	58	0.43
Biography	40	0.29
Historical Article	39	0.29

Review	23	0.17
Evaluation Study	11	0.08
Published Erratum	10	0.07
Guidelines	7	0.05
Comment	5	0.04
News	4	0.03
Undefined	5013	36.91
	13580	100.00

Table 1 explains the different forms of documents in the field of neuroscience, shows that maximum publication published in journal article with 40.19% of publications, followed by case reports (16.77%), letter (1.88%), comparative study is (1.81%), clinical trail (0.98%), editorial (0.43%) etc.,. It is evident that researcher prefer journals to publish and communicate their research out in the form of articles.

Table 2 Year-wise Distribution of Neuroscience Publications

Year	No. of Publication	%	Cumulative of Publication	%
1989	26	0.19	26	0.19
1990	48	0.35	74	0.54
1991	57	0.42	131	0.96
1992	56	0.41	187	1.38
1993	80	0.59	267	1.97
1994	70	0.52	337	2.48
1995	139	1.02	476	3.51
1996	121	0.89	597	4.40
1997	103	0.76	700	5.15
1998	130	0.96	830	6.11
1999	133	0.98	963	7.09
2000	151	1.11	1114	8.20
2001	174	1.28	1288	9.48
2002	158	1.16	1446	10.65
2003	243	1.79	1689	12.44
2004	207	1.52	1896	13.96
2005	249	1.83	2145	15.80
2006	279	2.05	2424	17.85
2007	290	2.14	2714	19.99
2008	338	2.49	3052	22.47
2009	422	3.11	3474	25.58
2010	505	3.72	3979	29.30
2011	499	3.67	4478	32.97
2012	537	3.95	5015	36.93
2013	836	6.16	5851	43.09

2014	1224	9.01	7075	52.10
2015	1285	9.46	8360	61.56
2016	1653	12.17	10013	73.73
2017	1810	13.33	11823	87.06
2018	1757	12.94	13580	100.00
Total	13580	100.00		

Table 2 reveals that the neuroscience research output during 30 years and a mean of article publication was 452.67 articles every year and it's observed that the research output is gradually increased and research output was slightly decrease in these years 1992, 1994,1996,2002,2004,2011,and 2018, it may be due to lack of research infrastructure and therefore the gap between the publications. Out of 13580 articles, 1810 (13.33 %) articles were published in 2017.
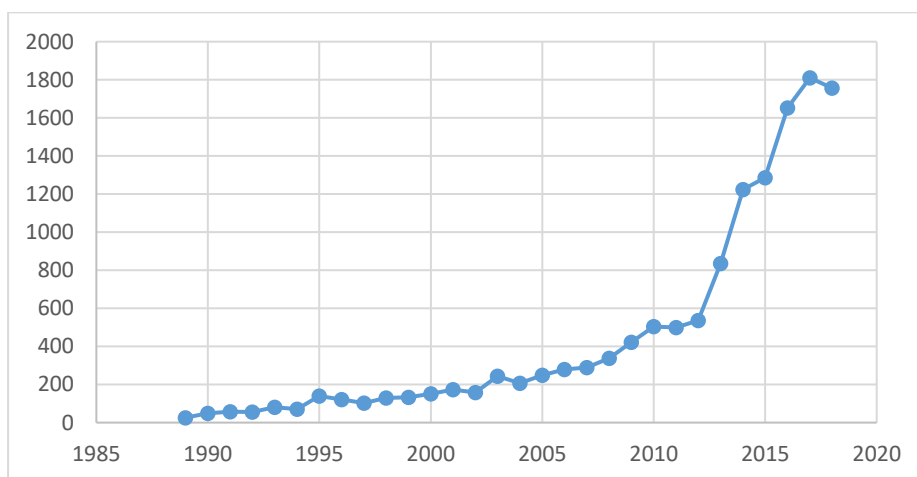

Fig. No. 1 Year Wise Distribution of Neuroscience Publication

Table 3 Authorship Pattern in India Publication

Authorship	No. of Publications	%	Cumulative No. of Publications	%
Single Author	792	5.83	792	5.83
Two Author	1686	12.42	2478	18.25
Three Author	2048	15.08	4526	33.33
Four Author	2452	18.06	6978	51.38
Five Author	1882	13.86	8860	65.24
Six Author	1343	9.89	10203	75.13
Seven Author	784	5.77	10987	80.91
Eight Author	606	4.46	11593	85.37

Nine Author	387	2.85	11980	88.22
Ten Author	238	1.75	12218	89.97
> Ten Author	1362	10.03	13580	100.00
Total	13580	100.00		

Table 3 shows that authorship pattern of neuroscience publications. Out of 13580 publications 12788 (94.17%) were contributed by multi-authors followed by 792 (5.83%) were contributed by single author. Here the most accepted collaboration type was notably two, three, four and five -author

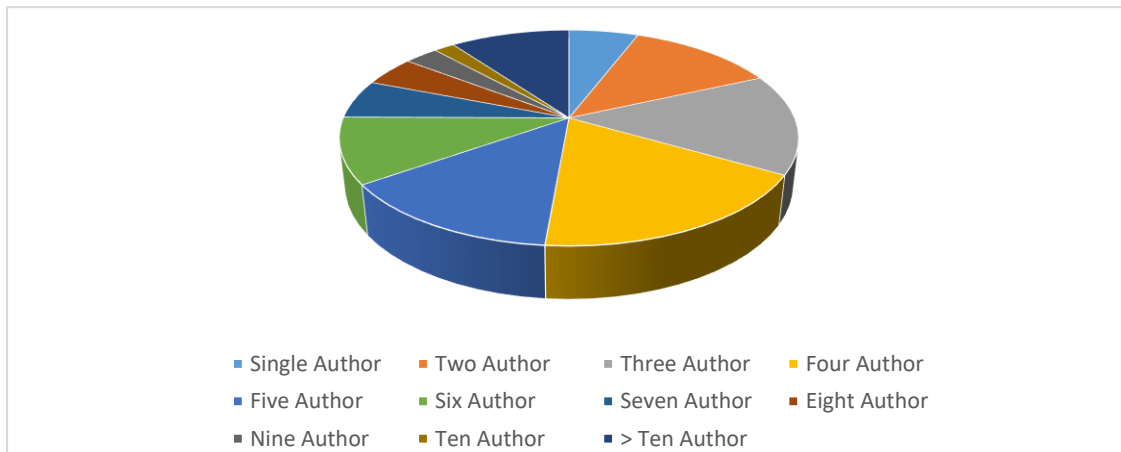Fig No. 2 Authorship Pattern in India Publication

Table 4 Authorship Patterns and Collaborative Measures in Neuroscience Research Trends in India

Block Year	Single Author	Multiauthor Publication	Mutli - Author	Total No. of Author	Total No. of Publication	CI	DC	CC	MCC
1989-1993	25	242	866	891	267	0.30	0.97	0.30	0.70
1994-1998	35	528	1937	1972	563	0.29	0.98	0.29	0.71
1999-2003	80	779	2969	3049	859	0.28	0.97	0.28	0.72
2004-2008	129	1234	5449	5578	1363	0.24	0.98	0.24	0.76
2009-2013	224	2575	11822	12046	2799	0.23	0.98	0.23	0.77
2014-2018	299	7430	44930	45229	7729	0.17	0.99	0.17	0.83
Total	792	12788	67973	68765	13580	0.20	0.99	0.20	0.80

*CI: Collaborative Index   * DC: Degree of Collaboration *CC: Collaborative Coefficient and *MCC: Modified Collaborative Coefficient

Table 4 demonstrates that overall, the 94.17% (12,788) of the articles are collaborative and 5.83% (792) of the articles are single authored. CI is slightly decreased from the block year

1989-1993 to 2014-2018 with a mean of 0.20. DC varies between 0.97 for the block year 1989-1993, 0.98 for the block year 1994-1998 and varies from 0.98 to 0.97 for the block year 199-2003 and this table shows a high proportion of multiple author papers. (DC = 1 signifies that the number of single author paper is zero). To distinguish between the levels of collaborative authors, two parameters CC and MCC were calculated in this table. CC slightly decreased from the block year 1989-1993 to 2014-2018 with a mean value of 0.20. MCC slightly increased from the block year 1989-1993 to 2014-2018 with a mean value of 0.80.

Table 5 Identification of most prolific Authors in Neuroscience in India

Rank	Author	No of Article	Percentage
1.	Misra U K	302	2.22
2.	Kalita J	238	1.75
3.	Kumar A	228	1.68
4.	Garg R K	220	1.62
5.	Sinha S	215	1.58
6.	Kumar S	193	1.42
7.	Tripathi M	182	1.34
8.	Taly Ab	173	1.27
9.	Pal P K	171	1.26
10.	Verma R	161	1.19
11.	Sharma S	160	1.18
12.	Jain S	143	1.05
13.	Shankar S K	136	1.00
14.	Satishchandra P	133	0.98
15.	Anand A	133	0.98
16.	Prabhakar S	132	0.97
17.	Saini J	132	0.97
18.	Behari M	131	0.96
19.	Prasad K	125	0.92
20.	Gupta A	124	0.91

Table 5 shows that the highly productivity in medical researcher based on their highest publication on neuroscience research literature in India. The table shows the rank, list of 20 most prolific authors in neurology research over the 30 years (1989-2018). Mishra U K who

published 302 stood first rank followed by Kalita J 238 publications; Kumar A has published 228 he holds third rank and Garg R K has published 1.62% of total publications.

Table 6 Top 20 Journals in Neuroscience

Sl NO.	Name of Journals	No. of Publication	Percentage
1.	Neurology India	1619	11.92
2.	The Journal of the Association of Physicians of India	470	3.46
3.	BMJ case reports	320	2.36
4.	Journal of the neurological sciences	248	1.83
5.	Neurology	237	1.75
6.	Neuroscience	201	1.48
7.	Indian journal of paediatrics	185	1.36
8.	Asian journal of psychiatry	121	0.89
9.	PloS one	112	0.82
10.	Indian paediatrics	99	0.73
11.	Epilepsia	99	0.73
12.	Journal of child neurology	94	0.69
13.	Journal of clinical neuroscience	91	0.67
14.	Clinical neurology and neurosurgery	91	0.67
15.	Seizure	89	0.66
16.	Scientific reports	86	0.63
17.	Acta Neurologica Scandinavica	86	0.63
18.	Journal of neurology, neurosurgery, and psychiatry	78	0.57
19.	Epilepsy research	75	0.55
20.	Parkinsonism & related disorders	74	0.54

Table 6 shows that the patterns of research output in Neuroscience as reflected in publications in most productive national and international journals during the 1989-2018. In this study we have chosen for analysis only top 20 productive journals. Journals are evaluated based on the literature output during the 30 years (1989-2018). Neurology in India has in the top ranked with 11.92% of publications (1619) and followed by The Journal of the Association of Physicians of India is next position with 3.46%, BMJ case reports is in third position (2.36%).

Table 7 India's Collaborative with Other Nations

Sl No.	Name of Country	No. of Publication	Percentage

1.	United States of America	3883	42.24
2.	England	2523	27.44
3.	Netherlands	1217	13.24
4.	Germany	373	4.06
5.	Switzerland	341	3.71
6.	Ireland	121	1.32
7.	Denmark	102	1.11
8.	Scotland	101	1.10
9.	South Korea	68	0.74
10.	France	67	0.73
11.	Italy	63	0.69
12.	Australia	53	0.58
13.	Austria	44	0.48
14.	United Arab Emirates	41	0.45
15.	Belgium	36	0.39
16.	China	33	0.36
17.	New Zealand	32	0.35
18.	Japan	27	0.29
19.	Canada	26	0.28
20.	Singapore	21	0.23
21.	Iran	21	0.23

Table 7 illustrates that the Indian Publication output in Neuroscience was 67.70% (9193) during the 1989-2018. A total 21 foreign countries collaborative with India for 30 years. USA the largest share (42.24%) of international collaboratives publication with India, followed by England (27.44%), Netherlands (13.24%), Germany (4.06%). It is found that India, in addition to having second highest research productions in research collaboration with other countries.

Conclusion:

Considering the above facts, it is concluded that the research output in the field of neuroscience publication was decreased in 1992,1994,1996,1997, 2001 and gradually increased from 2002 to 2018 and an average of neuroscience publication was 452.67 articles per year. Most of the researcher opts to publish and communicate their research output in the form of journal articles (40.19%). Most of the researchers were accepted collaborative work or team research. To assess the author collaboration using Collaborative Index (CI), Degree of Collaboration (DC), Collaborative Coefficient (CC) and Modified Collaborative Coefficient (MCC) were employed

and proved that 94.17 % of the research outputs were of collaborative work i.e., 12,788 records and most prolific authors in neuroscience research in India over the 30 years (1989-2018). Authors ranking based on their publications Mishra U K who published 302 stood the first rank. Journals are evaluated based on the publications' output during the 30 years (1989-2018). Neurology in India has in the top ranked with 11.92% of publications (1619) and USA the largest share (42.24%) of international collaboratives publication with India. In India, the research in neuroscience field is the infantile stage. It may be due to the non-availability of funds and supportive training programs. Strengthening of training programs at the national and international level, institutional level becomes mandatory.

References:

1. Priya, A.S. and Khaparde, V.S. (2012). Authorship pattern: Scientometric study on citation in journal documentation. *Electronic International Interdisciplinary Research Journal (EIIRJ)*. 1(3): pp.53–64

2. Elango, B. & Rajendran, P. (2012). Authorship trends and collaboration pattern in the marine sciences literature: a scientometric study. *International Journal of Information Dissemination and Technology*, 2(3), pp.166-169.

3. Skaggs, Dr. W. E. (08/07/2020). *Nervous system*. Scholarpedia. http://www.scholarpedia.org/article/Nervous_system

4. Shahabuddin, S. (2013). Mapping neuroscience research in India – a bibliometric approach. *Current Science, 104*(12), pp.1619-1626.

5. S. Raja (2012). A scientometric analysis of space neuroscience research publication in global: 1999-2012. *International Journal of Applied Engineering and Technology*, 2 (2), pp.190-199.

6. Bala, A. and Gupta, B.M (2010). Mapping of Indian neuroscience research: A scientometric analysis of research output during 1999-2008. *Neurology India*, 58(1), p.35-43.

7. Braun, T., Glänzel, W. and Schubert, A. (2001). Publication and cooperation patterns of the authors of neuroscience journals. *Scientometrics*, 51(3), pp.499-510.

8. Arora, Jagdish and Pawan, Usha. (1995). Collaborative research and authorship patterns in immunology: correlation between multiple authorship and citedness. *IASLIC Bulletin*, 40 (2), pp.73-85.

9. P Rajendran, J Manickaraj, B Elango (2013). Scientometric Analysis of Indiaâs Research Output on Wireless Communication (2001-2012). *Journal of Advances in Library and Information Science*, 2(3), pp. 105-111.

10. Karpagam, R., Gopalakrishnan, S., Babu, B. and Natarajan, M., 2012. Scientometric Analysis of Stem cell Research: A comparative study of India and other countries. *Collnet Journal of Scientometrics and Information Management*, 6(2), pp.229-252.

11. Priya, A.S. and Khaparde, V.S. (2012). Authorship pattern: Scientometric study on citation in journal documentation. *Electronic International Interdisciplinary Research Journal (EIIRJ)*, 1(3), pp. 53–64.

12. Srinivasa Ragavan, Surulinathi, Neelakandan (2012). Indian perspective of medicinal plant research: A Scientometric Study. *International Journal of Plant, Animal and Environmental Sciences*, 2 (3), pp 195-203.

13. Najari A, Yousefvand M (2013) Scientometrics study of impact of journal indexing on the growth of scientific productions of Iran. *Iran Journal of Public Health*, 42(10), pp.1134–1138.

14. Nadjla Hariri, Maryam Shekofteh and Ali Salahi Yekta (2012). Co-citation scientific maps: a case study of medical sciences in Iran. *Journal of Paramedical Sciences*, 3, pp.43-60.

15. Elango B, Rajendran P, Bornmann L (2013) Global Nanotribology Research Output (1996–2010): A Scientometric Analysis. *PLoS ONE,* 8(12): e81094. https://doi.org/10.1371/journal.pone.0081094

16. Gupta, B. and Bala, A.(2013). Alzheimer's Disease Research in India: A Scientometric Analysis of Publications Output during 2002-11. *Research in Neurology: An International Journal*, pp.1-11.

17. Sweileh, W.M., Zyoud, S.H., Al-Jabi, S.W. *et al.* (2014). Assessing urology and nephrology research activity in Arab countries using ISI web of science bibliometric database. *BMC Res Notes* **7,** 258. https://doi.org/10.1186/1756-0500-7-258

18. Ranganathan, C. and Balasubramani, R. (2013). Mapping of green chemistry research in India: A scientometric analysis. *Journal of Advances in Library and Information Science,* 2(4), pp.221-229.

19. Jesubright, John Jeyasekar and P, Saravanan (2014). A scientometric analysis of global forensic science research publications. *Library Philosophy and Practice,* (e-journal). 1024. https://digitalcommons.unl.edu/libphilprac/1024

20. Bhatia, K. P. (2006). Neurological practice – an Indian perspective. *Journal of Neurology, Neurosurgery & Psychiatry*, *77*(6),p.804. https://doi.org/10.1136/jnnp.2005.084301

21. Velmurugan, C. (2019). Mapping of Nephrology Research Performance of Global Scientists in Science Citation Index Expanded. *Library Philosophy and Practice (e-journal)*, e2151.