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Chithiraivel S

Librarian,, spchithiraivelphd@gmail.com

Jeysankar R

Assistant Professor, Department of Library and Information Science, Alagappa University, Karaikudi, India,
jeysankar71@gmail.com

Sivasekaran K

Librarian, Ayya Nadar Janaki Ammal College, Sivakasi. India, sivasekarank@gmail.com

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Authorship Patterns in Eosinophilia Research Literature: A Scientometric Analysis

Dr.S.Chithiraivel¹, Dr.R.Jeyshankar² & Dr.K.Sivasekaran³

¹Librarian, Sri Kalishwari College, Sivakasi, India.

E.mail: spchithiraivelphd@gmail.com

²Assistant Professor, DLISc, Alagappa University, Karaikudi, India

E-mail: jeyshankar71@gmail.com

³Librarian, Ayya Nadar Janaki Ammal College, Sivakasi. India.

E. mail: sivasekaran@gmail.com

Corresponding Author: **Dr. R. Jeyshankar**, Assistant Professor,
Dept. of Library and Information Science, Alagappa University, Karaikudi, India,
E-mail: jeyshankar71@gmail.com

Abstract

The presents study the examine the authorship patterns in the field of eosinophilia literature based on the publications indexed in the Web of Science Core Collection during the period from 1998 to 2017. Totally 70337 researchers have contributed 12118 publications produced over 1,797 journals in the subject of eosinophilia. Findings of the analysis revealed that the author's productivity examines the trend in understanding the research process in any discipline of science; maximum records of 1625 publications produce by four authors. It is found that the degree of collaboration is an increasing and decreasing trend. This study includes an overview of co-authorship, efficiency and ranking of the researches, visualizing the co-authorship network; analysis of group author's contribution in eosinophilia research and time series analysis for single authors and joint authors. The author "Rothenberg ME" has published 116 publications with 11662 citation scores; 49.88 average citations per paper, with 60 h-index values measured and it occupy the first rank.

Keywords: Authorship Pattern, Prolific Authors, Time Series Analysis, Co-Authorship.

1 Introduction

The eosinophilia is largely based on clinical history; eosinophils are a kind of white blood cell that helps fight disease. A few aspects of a case alert the clinician as to the likely underlying cause of abnormally elevated eosinophils. The faithful role of

eosinophils in your body isn't clear, but they're usually linked with allergic diseases and certain infections. However, at times, more significant investigations need to occur to more clearly define the cause of their presence and possible role in disease presentation. They are made in your bone marrow and then travel to different tissues.

There has been a significant increase in numbers of people diagnosed with eosinophils in the past decade; researchers thought this was due to an increase in awareness among doctors and greater availability of tests. The eosinophilic is a chronic immune system disease; it has been identified only in the past two decades, but is now considered a major cause of digestive system. The research is ongoing and will likely lead to revisions in the diagnosis and treatment of eosinophil.

The eosinophils discharge cytokines which not only induce redness, but also attract more eosinophils and other protected cells of various types to the organ site. The release of various chemicals and immediate oxygen species by the eosinophils and other cells creates more tissue damage. In addition, eosinophils produce growth factors which are responsible for the fibrotic response to provocative injury in affected tissues. This study suggested needs to intensify its innovative strategies and international authorship collaboration to strengthen its research output, human resources, funds, public-health awareness through local campaigns, and initiatives for the prevention and treatment of eosinophils.

2 Review of Literature

Vellaichamy and Jeysankar (2018)¹ highlighted quantitatively the growth and development of world literature on hemophilia in terms of publications output as per SCOPUS database (2003-2017). During 2003-2017 a total of 13503 papers were published by the scientists in the field of hemophilia. Out of 13503 contributions, only 18.48% (2495 papers) of single authored and rest of 11008 papers (81.52%) were multi authored. USA is the top producing country with 3986 authorships (29.52%) followed by United Kingdom with 1438 authorships (10.65%). Still, in an international sense, relative productivity of India is low and requires more focused research and development. Bhardwaj² analysed the Ebola research literature. It revealed that 2446 papers have been published on Ebola virus in 159 journals, originating from 84 countries till December 31, 2013. These publications have received 69,960 citations until March 1, 2015. There are

enormous literatures available on authorship pattern measures used as scientometrics indicators in quantifying the research productivity of various subject fields. But a gap in the literature of studying authorship pattern in research output of eosinophilia felt and addressed by the present study. Nishavathi and Jeyshankar (2018)³ studied about the collaborative measures of published documents in the field of chromosome anomalies. It discussed about inadequacies of collaborative measures in analyzing the collaborating behavior and strength of collaboration in a discipline. It also suggested centrality measures, as degree centrality, closeness, and between in analyzing the collaboration among the researchers and scientists in the field of chromosome anomalies. The bibliographical database PubMed is used as sources for bibliometrics and 35912 citations examined for co – authorship pattern, collaborative behavior of the scientists. Centrality measures were used to construct a network for co – authorship in chromosome anomalies research during the year 2007-2016 and to find out the most influential predominant author in the field.

Gupta and Dhawan⁴ examined Indian output of 4402 papers in robotics research, as indexed in Scopus database during 2007-16, with a view to understand India's growth rate, global share, citation impact, international collaborative papers share, distribution of publications by broad subjects, productivity and in addition discuss the citation profile of top organizations and authors, preferred communication media and characteristics of high cited papers. Jeyshankar and Chithiravel (2019)⁵ analysed the Eosinophilia research output carried out during the year 1998 – 2017 the different parameters including authorship pattern, growth, Time Series Analysis Degree of Collaboration, Institutions' contribution, most productivity journals were analysed. Two and more authored papers constitute majority of the contribution and degree of collaboration had a maximum value of 7.14. The result shows that research development activities are increasing in Eosinophilia research in India. Jisha and Raja (2019)⁶ study analyzes the impact of Poultry industry Research Publications indexed in the Scopus database during the period 2008 to 2017. The analysis revealed that the total of 4248 documents indexed in the database during the selected period of study. The Exponential growth rate is found to be highest in the years 2012 and 2014 with the value 0.226. The mean Degree of collaboration, Collaborative index, Collaborative coefficient is found to be 0.89, 4.62 and

0.66 respectively. Average citations per paper are 12.28 and the average Publication efficiency index is 1.15. The study also tests the scientific productivity of authors through Lotka's law.

3. Objectives

- To find out the growth of eosinophilia literature output during the period 1998–2017;
- To examine the most prolific contributors in the field of eosinophilia literature;
- To know the author wise fractional count on papers during the study periods;
- To study the nature of authorship pattern in the eosinophilia literature;
- To identify the single Vs. multi-authored papers and determine the degree of collaboration;
- To analyzes the time series analysis for single authors and joint authors

4. Methodology

This study used 'Eosinophilia' as the search term, limiting this term to the occurrence in 'article titles, abstracts or keywords'; Study solely included papers published from 1998-2017; for this study, all kind of published works was considered that are cited by and include references to other academic publication and are together referred to as 'paper' in this study. The total of 12,118 publications with 2, 83,880 total citation scores were received from the web of science database. The study also analyzed and refined publication output by prolific authors according to their highest research productivity with h-index and highest citations, analysis of authorship pattern, block- wise productivity of highly prolific authors on Eosinophilia research, collaborative index, single Vs. multi-author and degree of collaboration, editors contribution, analysis of group authors and overall time series analysis.

5. Data Analysis and Interpretation

Table 1: Literature Output on Eosinophilia Research: Year- wise Evaluation

S. No	Years	Records	%	TCS	%	Rank
1	1998	444	3.66	20159	7.10	20
2	1999	563	4.65	20565	7.24	13

3	2000	514	4.24	20209	7.12	17
4	2001	508	4.19	20755	7.31	18
5	2002	520	4.29	19603	6.91	16
6	2003	545	4.50	20725	7.30	15
7	2004	480	3.96	19016	6.70	19
8	2005	553	4.56	16581	5.84	14
9	2006	564	4.65	16074	5.66	12
10	2007	575	4.75	14500	5.11	10
11	2008	567	4.68	13131	4.63	11
12	2009	618	5.10	14613	5.15	8
13	2010	611	5.04	12372	4.36	9
14	2011	641	5.29	11445	4.03	7
15	2012	675	5.57	10985	3.87	6
16	2013	706	5.83	10151	3.58	5
17	2014	765	6.31	9021	3.18	2
18	2015	749	6.18	7374	2.60	3
19	2016	793	6.54	4689	1.65	1
20	2017	727	6.00	1912	0.67	4
Total		12118	100.00	283880	100.00	

During the study period 1998 to 2017 (Twenty Years), 12118 records were downloaded from the database of Web of Science for the analysis of research productivity on “Eosinophilia”. According to the publication output from the Table 1 reveals that the total number of records published were 12118 at an average of 606 records per year. The Total Citation Scores received from 12118 research publications were 283880 at an average citation score of 14194 respectively.

The number of research publications increased year by year, which started with 444 (3.66%) in the year of 1998 and soars to 793 (6.54%) records in the year 2016. The research growth started slowly, but has grown steadily and attained to the record count of 12118 in the year 2017, which may grow and grow annually in the near future. The year 2016 has highest number of publications 793(6.54%) with 4689 Total Citation Scores and being a first position among years output for 20 years. This is followed by the year 2014 which has 765 (6.31%) records and it stood in the second position of publishing with 9021 TCS scored. The year 2015 has 749 (6.18%) publications and occupies the third position along with 7374 TCS measured. The year 1998 has 444 publications with 20159 TCS; it stood with the lowest publications in the study period.

The year 2001 which was responsible for 508(4.19%) number of research publications secured the most Total Citation Scores of 20755(7.31%). The year 2003 which was responsible for the publication of 545 records secured the second highest Total Citation Scores of 20725. The third place of the maximum secured Total Citation Scores was credited for the year1999 for a Total Citation Scores of 20565 for a total number of publications of 563. Throughout the year from 1998 to 2017, the three years 2001, 2003, 1999 were the more prolific years which shared the first three places for securing more Total Citation Scores.

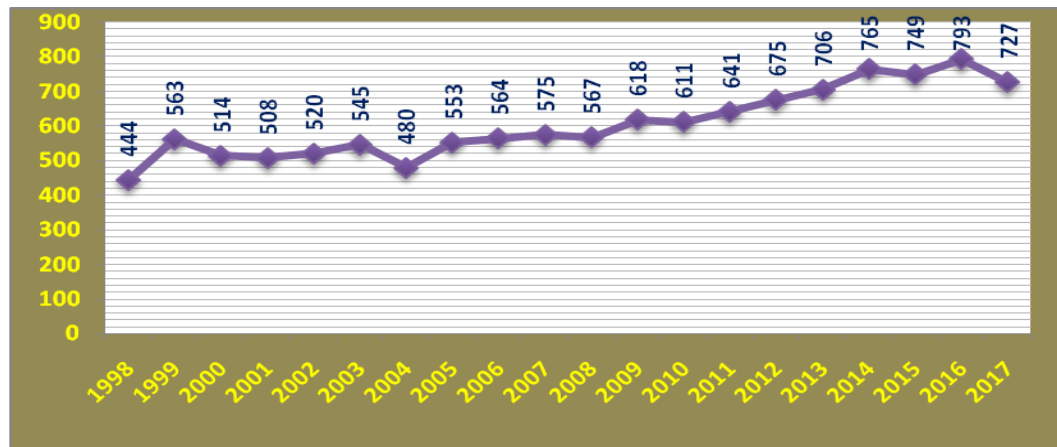


Figure 1: Year-wise Productivity of Eosinophilia Research

Table 2: Showing Prolific Authors according to their Highest Research Productivity with H-index

S. No	Author	Records (Ranks)	TCS	Cited Reference	Average CR	H-index (Rank)
1	Rothenberg ME	116	11662	5786	49.88	60
2	Gelfand EW	69	3553	2963	42.94	36
3	Lee JJ	55	2284	2415	43.91	24
4	Cross NCP	54	3536	1116	20.67	21
5	Simon HU	53	3443	2116	39.92	24
6	Talley NJ	50	1243	1974	39.48	17
7	Foster PS	49	3784	2402	49.02	30
8	Hamid Q	48	2394	1821	37.94	28
9	Tefferi A	48	4544	2241	46.69	25
10	Brightling CE	45	4109	1388	30.84	24
11	Dellon ES	45	1724	2192	48.71	28
12	Kim SH	43	532	968	24.82	14
13	Pavord ID	43	4642	1424	33.12	25
14	Reiter A	43	950	1097	25.81	14

15	Klion AD	42	2402	1544	36.76	23
16	Takeda K	42	1923	1843	43.88	24
17	Matsumoto K	41	916	1297	31.63	13
18	Gleich GJ	40	2575	1798	44.95	23
19	Nutman TB	40	1912	1916	47.90	22
20	Chung KF	38	3104	1687	44.39	23
21	Dakhama A	36	1621	1770	49.17	24
22	Pardanani A	36	2371	1578	43.83	20
23	Joetham A	35	1823	1477	42.20	25
24	Lee JH	34	677	957	28.15	14
25	Hogan SP	33	3582	1951	59.12	28

In this analytical study period of 1998 to 2017; 70337 researchers have contributed 12118 publications produced over 1,797 journals in the subject of eosinophilia. In accordance to this the researcher has ranked according to their highest publications in the field of eosinophilia research. The first 50 authors are identified as the most productive contributors for this research.

The author “Rothenberg ME” has published 116 publications in eosinophilia research with 11662 total citation scores; 49.88 average citations per paper, with 60 h-index values measured and it occupies the first rank, followed by the author of “Gelfand EW” who has published 69 records have 3553 of TCS, 42.94 of average cited reference per paper and 36 h-index value occupied the second rank. The authors Lee JJ, Cross NCP, and Simon HU has published 55, 54 and 53 articles; 2284, 3536 and 3443 TCS ; ACPP 43.91, 20.67 and 39.92; 24,21 and 24 h-index values respectively scaled and it positioned in the third, fourth and fifth rank.

The author “Talley NJ” has published 50 publications; 1243 TCS; 39.48 ACPP and 17 h-index values scaled and it occupied the sixth rank position to the eosinophilia productivity. The authors Foster PS have published 49 articles; 3784 TCS; 49.02 ACPP and 30 h-index values scaled and it is occupied seventh position of in this research. Hamid Q and Tefferi A both has equally published 48 articles; 2394 and 4544 TCS; 37.94, 46.69 ACPP and 28, 25 h-index values scaled and it occupied the eighth position. Followed by the authors Brightling CE and Dellon ES has equally published 45 articles; 4109 and 1724 TCS; 30.84 and 48.71 of ACPP and their h-index values 24 and 28 were

scaled and it occupies the ninth rank positioned to the productivity of eosinophilia output.

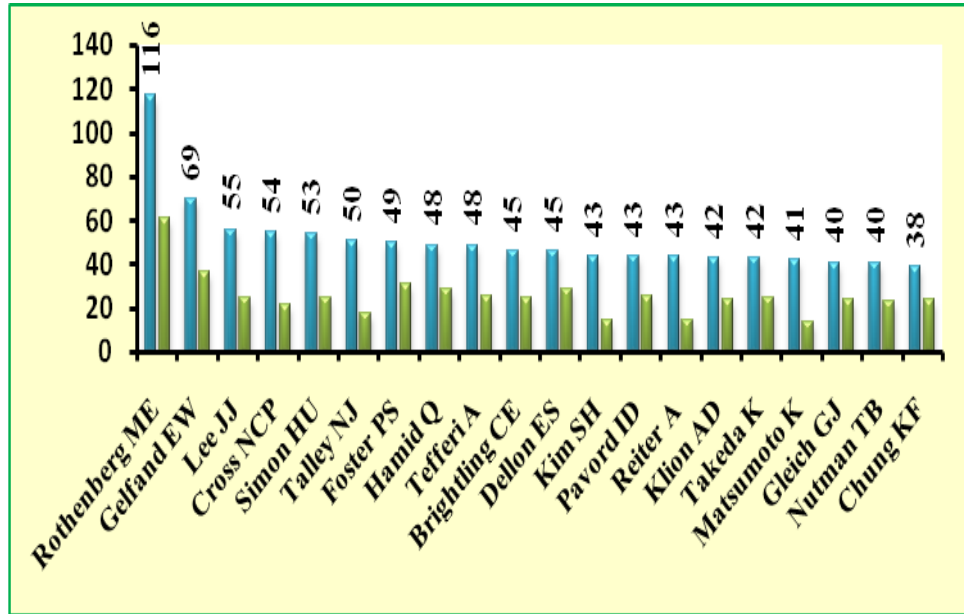


Figure 2: Contribution of Author's (Top20) highest research productivity

Table 3: Showing Prolific Authors according to their Highest Citation on Eosinophilia

S. No	Author	Records	TCS	ACPR
1	Rothenberg ME	116	11662	100.53
2	Pavord ID	43	4642	107.95
3	Tefferi A	48	4544	94.67
4	Brightling CE	45	4109	91.31
5	Foster PS	49	3784	77.22
6	Hogan SP	33	3582	108.55
7	Gelfand EW	69	3553	51.49
8	Cross NCP	54	3536	65.48
9	Collins MH	21	3457	164.62
10	Putnam PE	19	3449	181.53
11	Simon HU	53	3443	64.96
12	Wardlaw AJ	20	3188	159.40
13	Chung KF	38	3104	81.68
14	Kay AB	21	3011	143.38
15	Liacouras CA	15	2796	186.40
16	Mishra A	32	2766	86.44
17	Sterk PJ	26	2653	102.04
18	Hargreave FE	24	2618	109.08
19	Gleich GJ	40	2575	64.38
20	Pizzichini E	17	2556	150.35

21	Inman MD	27	2533	93.81
22	O'Byrne PM	33	2530	76.67
23	Furuta GT	32	2439	76.22
24	Klion AD	42	2402	57.19
25	Hamid Q	48	2394	49.88

Table 3 reveals the top 25 prolific authors of the subject of eosinophilia research belong to their highest citations according to their research output.

Rotherberg ME has got highest citations 11662 with 116 publications, and 100.53 average citations per paper measured and it occupies the first rank. Followed by the authors of Pavord ID has published 43 publications; 4642 TCS; average citation per paper 107.95; 'Tefferi A' has published 48 publications which have 4544 of TCS, 94.67 average citation per paper, Brightling CE has published 45 articles; 4109 TCS; 91.31 average citation per paper scaled rank second, third and fourth position to the eosinophilia productivity respectively.

Few authors have produced less number of publications but they got a very good number of citations. The authors, Sheppard D, Locksley RM, Donaldson DD and Gilliland DG have published 5, 7, 9 and 8 records and their average citation per paper is 421.00, 322.00, 248.67 and 241.75 respectively. From the above Table Rotherberg ME has got best citation score of 11662; three authors have got more than 4000 citations, ten authors have got more than 3000 citations, 26 authors have got more than 2000 citation and 29 authors citation per paper is more than 100 during the study period.

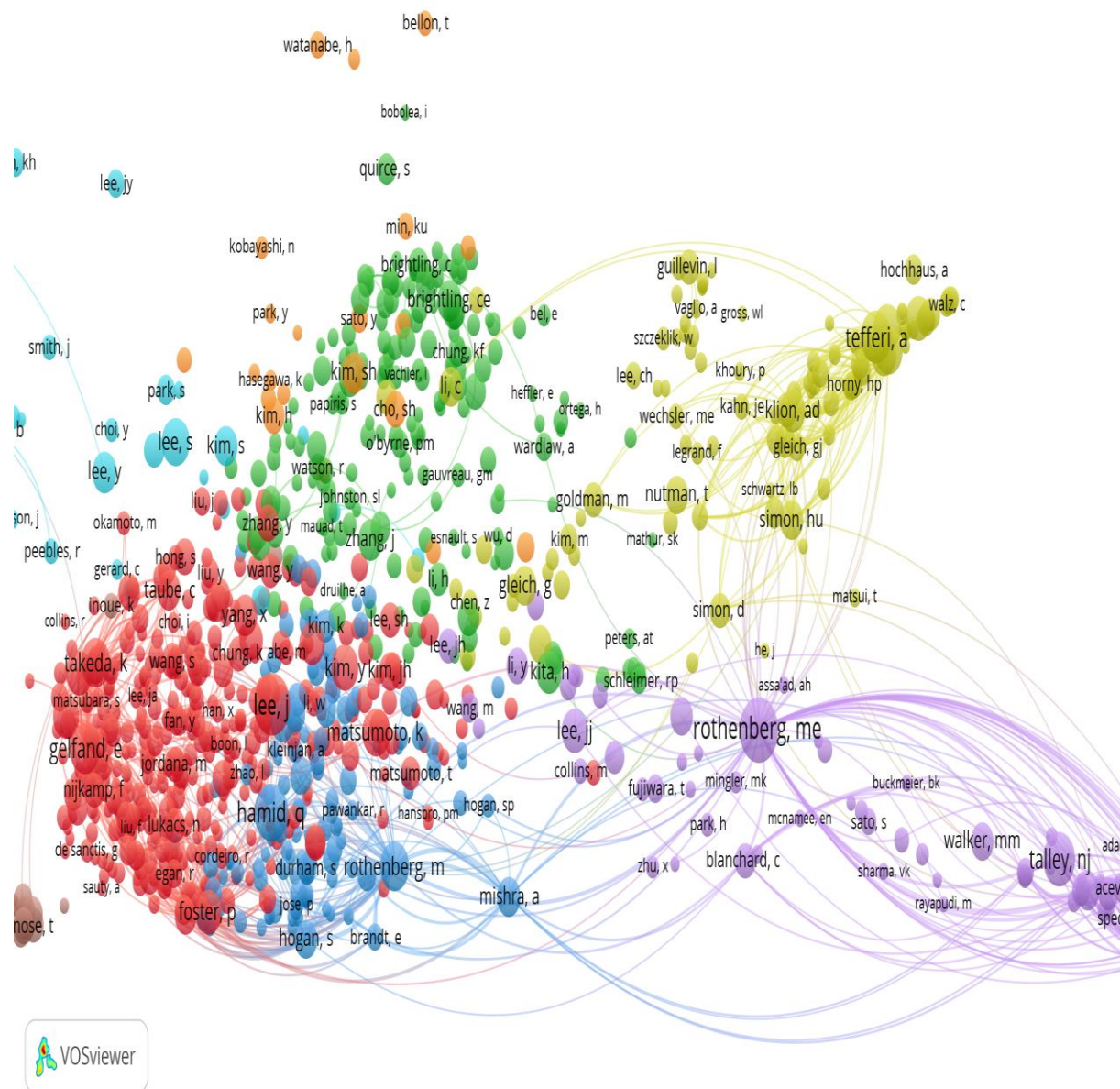


Figure 3: Bibliographic coupling of authors

Table 4: Year - wise Analysis of Authorship Pattern on Eosinophilia Research

Authors Years	1	2	3	4	5	6	7	8	9	10 & Above	Total
	1998	28	43	63	52	61	55	55	27	24	
1999	38	61	70	84	106	64	46	38	21	35	563
2000	31	47	70	78	74	74	52	35	16	37	514
2001	28	44	65	83	74	71	52	37	19	35	508
2002	24	42	70	78	83	61	46	38	31	47	520

2003	35	49	56	73	86	79	47	42	30	48	545
2004	28	49	59	67	71	64	45	35	22	40	480
2005	31	43	49	86	70	79	67	30	32	66	553
2006	30	55	71	76	82	79	48	40	22	61	564
2007	42	62	70	73	73	70	56	38	35	56	575
2008	33	61	80	71	54	84	48	41	29	66	567
2009	39	62	74	76	81	83	62	46	32	63	618
2010	32	51	67	82	84	73	54	56	33	79	611
2011	31	60	62	84	82	79	69	56	38	80	641
2012	36	57	68	84	80	92	64	62	40	92	675
2013	34	70	80	95	90	84	74	51	41	81	706
2014	40	77	70	114	75	76	69	64	51	129	765
2015	35	67	82	95	75	97	63	66	36	133	749
2016	29	79	105	95	95	98	67	57	44	124	793
2017	32	60	75	81	92	79	66	52	39	151	727
Records	656	1139	1407	1625	1590	1540	1150	911	640	1460	12118
Percent	5.41	9.40	11.61	13.41	13.12	12.71	9.49	7.52	5.28	12.05	100.00
Authors	656	2278	4221	6500	7950	9240	8050	7288	5760	18394	70337

In identifying the research performance in any area of particular science, it is vital to analyze the author's productivity. The author's efficiency is determined by the scientists in a specific field. Generally research activity is carried out by a scientist or a group of scientists, depending on the nature and aim of the particular research. It also depends on the ability and efficiency of the involved scientists. This is based on their skills, interest and talents.

The analysis of the author's productivity examines the prevailing trend in understanding the research process in any discipline of science. The maximum records of 1625 eosinophilia research is produce by four authors (6500) which is followed by 1590 records of five authors (13.12%), 1540 records of six authors (12.71%) and 1407 records of three authors (11.61%) respectively. The highest number of records (793) was produced in the year 2016 and lowest record output was observed in the year 1998 (444) respectively.

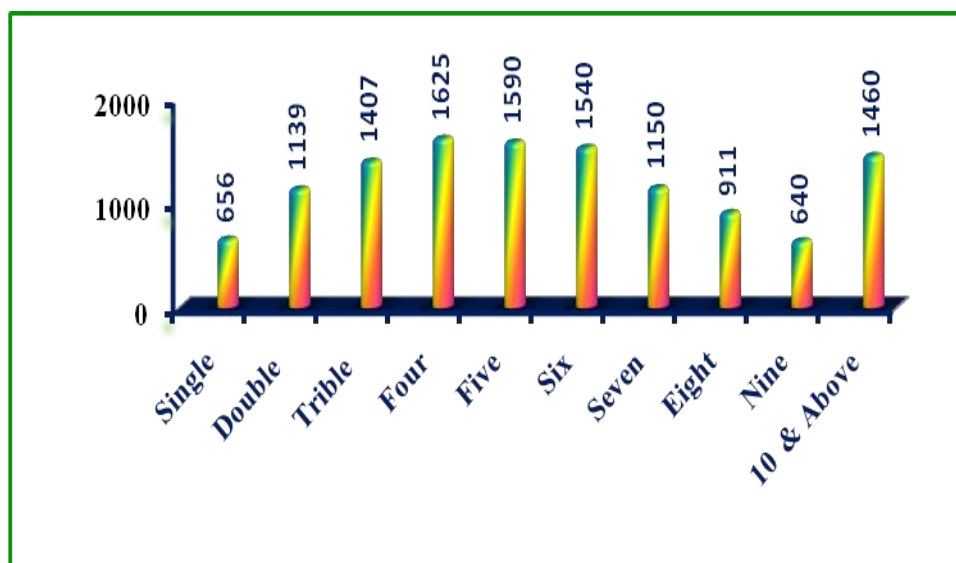


Figure 4: Contribution of Authorship on Eosinophilia Research

Table 5: Authorship Pattern of Most Productive Authors on Eosinophilia

S. No.	Author	Solo	2	3	4	5	6 & above	Records
1	Rothenberg ME	5	6	6	14	13	72	116
2	Gelfand EW	-	1	1	2	5	60	69
3	Lee JJ	-	1	1	1	3	49	55
4	Cross NCP	-	3	2	2	2	45	54
5	Simon HU	6	6	6	6	5	24	53
6	Talley NJ	8	8	1	2	4	27	50
7	Foster PS	1	-	3	4	8	33	49
8	Hamid Q	-	-	-	2	10	36	48
9	Tefferi A	4	7	8	3	3	23	48
10	Brightling CE	4	4	1	5	3	28	45
11	Dellon ES	5	3	5	5	5	22	45
12	Kim SH	-	1	2	2	3	35	43
13	Pavord ID	1	7	3	3	4	25	43
14	Reiter A	-	2	2	1	2	36	43
15	Klion AD	6	2	2	2	-	30	42
16	Takeda K	-	-	-	1	1	40	42
17	Matsumoto K	-	1	1	2	3	34	41
18	Gleich GJ	-	4	1	5	7	23	40
19	Nutman TB	3	7	1	3	1	25	40
20	Chung KF	6	2	1	4	2	23	38
21	Dakhama A	-	-	1	-	-	35	36
22	Pardnani A	1	4	6	2	2	21	36
23	Joetham A	-	-	-	-	1	34	35
24	Lee JH	-	-	-	2	7	25	34
25	Hogan SP	1	1	-	5	6	20	33

“Rothenberg ME” has published 116 publications, among those only 5 publications are contributed by individual; 6 publications by two authors; 6 publications by three authors team; 14 publications by four authors team; 13 publications by five authors team and 72 publications are contributed by six and more authors team. It shows that majority of publications has been done by six and above authored team.

“Gelfand EW” has published 69 publications, among those no one publication is contributed by individual; 1 publication by two authors; 1 publication by three authors team; 2 publications by four authors team; 5 publications by five authors team and 60 publications are contributed by six and more authors team. It shows that majority of publications has been done by six and above authored team.

It can be concluded from above Table analysis, “Rothenberg ME” more contributions by four, five and six & above author’s team; The highest records contributed by individual , “Talley NJ” and Descamps V contribution (8); two author’s team has “ Talley NJ” and “Molina-Infante J” (8), three author’s team “Molina-Infante J” (10) and Tefferi A (8); Majority of authors were produced their research at five authorship collaborative pattern.

Table 6: Block- wise Productivity of Highly Prolific Authors on Eosinophilia Research

S. No	Author	1998-2002	2003-2007	2008-2012	2013-2017	Total Records
1	Rothenberg ME	23	37	35	21	116
2	Gelfand EW	31	18	14	-	69
3	Lee JJ	16	8	17	14	55
4	Cross NCP	6	20	11	17	54
5	Simon HU	18	13	14	8	53
6	Talley NJ	-	-	16	32	50
7	Foster PS	25	-	5	7	49
8	Hamid Q	28	17	-	-	48
9	Tefferi A	-	24	18	-	48
10	Brightling CE	8	-	12	17	45
11	Dellon ES	-	-	9	36	45
12	Kim SH	-	6	16	17	43
13	Pavord ID	10	-	7	7	43
14	Reiter A	-	9	13	20	43
15	Klion AD	-	14	13	14	42

16	Takeda K	9	-	12	-	42
17	Matsumoto K	8	-	6	10	41
18	Gleich GJ	20	-	9	-	40
19	Nutman TB	8	-	5	7	40
20	Chung KF	15	6	-	13	38
21	Dakhama A	-	17	9	-	36
22	Pardanani A	-	19	10	-	36
23	Joetham A	19	--	5	--	35
24	Lee JH	-	13	8	11	34
25	Hogan SP	20	8	-	-	33

Table 6 shows the block wise productivity of most productive top 50 authors on eosinophilia research. The author 'Rothenberg ME' (116) has contributed all the blocks and highly published in second block (37) followed by third block (35), first block (23) and fourth blocks (21) respectively. The author 'Gelfand EW' has published 31 records in first block; 18 records in second block; 14 records in third block. No one records in fourth block. Records published in block wise, among top 50 authors, 29 authors only in first block (1998-2002) and second block (2003-2007), 40 authors in third block (2008-2012) and 22 authors in fourth block (2013-2017) respectively.

Table 7: Showing the Collaborative Index in Eosinophilia Research Output

S. No	Years	No. of Articles	No. of Authors	Collaborative Index
1	1998	444	2361	5.32
2	1999	563	2860	5.08
3	2000	514	2652	5.16
4	2001	508	2668	5.25
5	2002	520	2870	5.52
6	2003	545	3054	5.60
7	2004	480	2603	5.42
8	2005	553	3223	5.83
9	2006	564	3100	5.50
10	2007	575	3186	5.54
11	2008	567	3195	5.63
12	2009	618	3433	5.56
13	2010	611	3607	5.90
14	2011	641	3794	5.92
15	2012	675	4095	6.07
16	2013	706	4143	5.87
17	2014	765	4836	6.32
18	2015	749	4820	6.44

19	2016	793	4895	6.17
20	2017	727	4942	6.80
Total		12118	70337	5.80

It can be observed from the above Table that in the year 2017 published 727 publications with 4942 authors collaboratively has done and the percentage value of the research were 6.80; 2016 published 793 with 4895 authors and the percentage were 6.17 ; 2015 published 749 with 4820 and the percentage value of 6.44; The year 2014 published 765 with 4836 and the percentage value were 6.32; the year 1998 published 444 with 2361 and the percentage value were 5.32, followed by 1999 published 563 with 2860 and the percentage value of the research were 5.08, which is the lowest value than others. The value of collaborative index has increased from 1999 to 2017.

The ‘Collaborative Percent’ for universal level is 5.80 which show the popularity towards collaborative research pattern than single author research in chosen field of eosinophilia research. Here the fourth hypothesis (There has been an increasing trend in collaborative research in eosinophilia during the research period) has been proved.

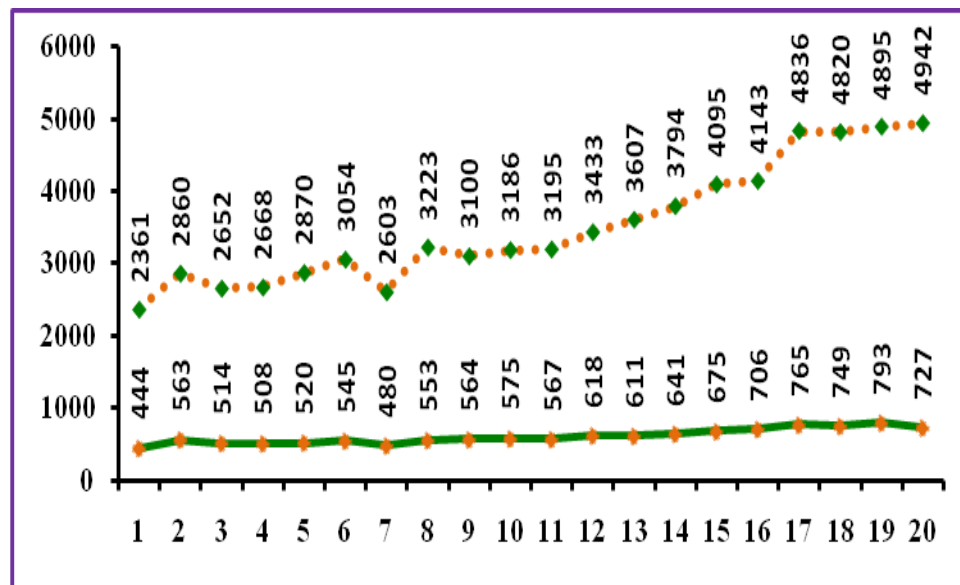


Figure 5: Analysis of No. of Authors and No. of Records

Table 8: Single Vs. Multi-Author and Degree of Collaboration of Eosinophilia Research

Years	Single Author		Multi Authored		Total	Degree of Collaboration
	No. of output	Percent	No. of output	Percent		
1998	28	4.27	416	3.63	444	0.94
1999	38	5.79	525	4.58	563	0.93
2000	31	4.73	483	4.21	514	0.94
2001	28	4.27	480	4.19	508	0.94
2002	24	3.66	496	4.33	520	0.95
2003	35	5.34	510	4.45	545	0.94
2004	28	4.27	452	3.94	480	0.94
2005	31	4.73	522	4.55	553	0.94
2006	30	4.57	534	4.66	564	0.95
2007	42	6.40	533	4.65	575	0.93
2008	33	5.03	534	4.66	567	0.94
2009	39	5.95	579	5.05	618	0.94
2010	32	4.88	579	5.05	611	0.95
2011	31	4.73	610	5.32	641	0.95
2012	36	5.49	639	5.57	675	0.95
2013	34	5.18	672	5.86	706	0.95
2014	40	6.10	725	6.33	765	0.95
2015	35	5.34	714	6.23	749	0.95
2016	29	4.42	764	6.67	793	0.96
2017	32	4.88	695	6.06	727	0.96
	656 (5.41)	100.00	11462(94.59)	100.00	12118	(19.85)0.95

The above Table 8 reveals that single vs. multi-author papers research productivity on eosinophilia. Among the total publications, single authors have published 5.41 percent and the remaining 94.59 percent is multi authored. In the year 1998 is only 4.27 percent of records have been produced by single authored contribution and 3.63 percent of records were by collaborative contribution with 0.94 degree of collaboration. In the year 1999, 5.79 percent of records were products of the single authored contribution and 4.58 percent of records were by collaborative contribution with 0.93 degree of collaboration; the year 2000 has 4.73 percent of records have produced by the single authored contribution and 4.21 percent of records were by collaborative contribution with 0.94. The output is steadily increased in both single and multi-author research output. Finally in the year 2016 and 2017, 4.42 and 4.88 percent of records have produced by the single author contribution and 6.06, 6.67 percent of records were by collaborative contributions with same value of 0.96 degree of collaboration.

Table 9: Editors Contribution of Eosinophilia Research

S. No	Editors	Records
1	Huether G	8
2	Kochen W	8
3	Simat TJ	8
4	Steinhart H	8
5	Chadwick D	2
6	Goode JA	2
7	Abbas Ak	1
8	BijlsmaJwj	1
9	Brown F	1
10	Curtis N	1
11	Cutolo M	1
12	Dixon Fj	1
13	Finn A	1
14	GalliSj	1
15	Gershwin Me	1
16	Giuli R	1
17	Gregersen H	1
18	HaaheimLr	1
19	Howley Pm	1
20	LefeverFf	1
21	Mallia C	1
22	Marone G	1
23	Masi At	1
24	Mayer L	1
25	MehraNk	1

The Table 9 analysis twenty years of the editor's contribution of eosinophilia research productivity; there are more than 50 editors contributed, from this Table top 25 editors listed. The editors, Huether G, Kochen W, Simat TJ and Steinhart H were contributed each 8 records. Chadwick D and Goode JA are contributed each 2 records. The remaining 32 editors were contributed each one records.

Table 10: Analysis of Group Authors (top 25) Contribution in Eosinophilia Research (94)

S. No	Group Authors	Records	Percent
1	French Eosinophil Network	3	0.02
2	French Vasculitis Study Group	3	0.02
3	Taiwan Severe Cutaneous Adverse	3	0.02
4	Childhood Asthma Management Program	2	0.02
5	European Leukemianet	2	0.02
6	Geosentinel Surveillance Network	2	0.02

7	PPI- REE Task Force European Society	2	0.02
8	PPI-REE Task Force European Society	2	0.02
9	Unbiased Biomarkers Prediction Study Group	2	0.02
10	Unbiased Biomarkers Prediction Study Group	2	0.02
11	AERIS Study Group	1	0.01
12	AgenceFrancaiseSecurite Sanitaire Produits	1	0.01
13	AIEOP is the Italian Association of Pediatric Hematology	1	0.01
14	Airway Inflammation Research Group	1	0.01
15	Alex Study Group	1	0.01
16	American Academy of Allergy, Asthma and Immunology Beclomethasone	1	0.01
17	AMPUL Study Group	1	0.01
18	Antileukotriene Working Group	1	0.01
19	Asian Benralizumab Study Group	1	0.01
20	AST Infectious Diseases Community Of Practice	1	0.01
21	Asthma Clinical Research Network	1	0.01
22	British Community Stand Haematology	1	0.01
23	British Infection Society	1	0.01
24	Bronchoscopic Exploratory Research Study	1	0.01
25	CATIE Investigators	1	0.01

The table 10 shows that the group authors publication of eosinophilia research productivity on time span 1998-2017. The Groups ‘French Eosinophil Network’, ‘French Vasculitis Study Group’ and ‘Taiwan Severe Cutaneous Adverse’ were contributed 3 records each. Followed 7 groups of researchers were contributed 2 records each and the remaining groups (84) were contributed single records during the study period.

Table 11: Time Series Analysis for Single Authors

S. No	Year	Records (Y)	X	X ²	XY
1	1998	28	-9.5	90.25	-266
2	1999	38	-8.5	72.25	-323
3	2000	31	-7.5	56.25	-232.5
4	2001	28	-6.5	42.25	-182
5	2002	24	-5.5	30.25	-132
6	2003	35	-4.5	20.25	-157.5
7	2004	28	-3.5	12.25	-98
8	2005	31	-2.5	6.25	-77.5
9	2006	30	-1.5	2.25	-45
10	2007	42	-0.5	0.25	-21
11	2008	33	0.5	0.25	16.5
12	2009	39	1.5	2.25	58.5
13	2010	32	2.5	6.25	80
14	2011	31	3.5	12.25	108.5

15	2012	36	4.5	20.25	162
16	2013	34	5.5	30.25	187
17	2014	40	6.5	42.25	260
18	2015	35	7.5	56.25	262.5
19	2016	29	8.5	72.25	246.5
20	2017	32	9.5	90.25	-266
Total		$\Sigma Y=656$	$\Sigma X=0$	$\Sigma X^2=665$	$\Sigma XY=151$

Straight Line equation $Y_c = a + bX$

Since $\Sigma x = 0$

$$a = \Sigma Y/N = 656/20 = 32.8; b = \Sigma XY/\Sigma x^2 = 151/665 = 0.23$$

Estimated literature in 2025 is when $X = 2025 - 2008 = 17$

$$= 32.8 + 0.23*17 = \mathbf{36.7}$$

Estimated literature in 2030 is when $X = 2030 - 2008 = 22$

$$= 32.8 + 0.23*22 = \mathbf{37.9}$$

Table 11 expects the future publications from single author in Eosinophilia research output. It is estimated that the single-authorship mode will contribute 36.7 publications in 2025 and 37.9 publications in 2030.

Table 12: Time Series Analysis for Joint Authors

S. No	Year	Records (Y)	X	X ²	XY
1	1998	416	-9.5	90.25	-3952
2	1999	525	-8.5	72.25	-4462.5
3	2000	483	-7.5	56.25	-3622.5
4	2001	480	-6.5	42.25	-3120
5	2002	496	-5.5	30.25	-2728
6	2003	510	-4.5	20.25	-2295
7	2004	452	-3.5	12.25	-1582
8	2005	522	-2.5	6.25	-1305
9	2006	534	-1.5	2.25	-801
10	2007	533	-0.5	0.25	-266.5
11	2008	534	0.5	0.25	267
12	2009	579	1.5	2.25	868.5
13	2010	579	2.5	6.25	1447.5
14	2011	610	3.5	12.25	2135
15	2012	639	4.5	20.25	2875.5
16	2013	672	5.5	30.25	3696
17	2014	725	6.5	42.25	4712.5
18	2015	714	7.5	56.25	5355
19	2016	764	8.5	72.25	6494

20	2017	695	9.5	90.25	6602.5
Total	$\Sigma Y=11462$	$\Sigma X=0$	$\Sigma X^2=665$	$\Sigma XY=10319$	

Straight Line equation $Y_c = a + bX$

Since $\Sigma X = 0$

$$a = \Sigma Y/N = 11462/20 = 573.1; b = \Sigma XY/\Sigma X^2 = 10319/665 = 15.7$$

Estimated literature in 2025 is when $X = 2025 - 2008 = 17$

$$= 573.1 + 15.7 * 17 = \mathbf{840}$$

Estimated literature in 2030 is when $X = 2030 - 2008 = 22$

$$= 573.1 + 15.7 * 22 = \mathbf{918.5}$$

Table 12 expects the future publications from joint author in Eosinophilia research output. It is estimated that the joint-authorship mode will contribute 840 publications in 2025 and 918.5 publications in 2030.

6. Conclusion

This study reveals that collaboration of more number of authors dominate in publication activities; author “Rothenberg ME” has published 116 publications with 11662 total citation scores; he got 49.88 average citations per paper, with 60 h-index values are measured and it occupies the first rank among 70737 authors. The author “Gelfand EW” who has published 69 records has 3553 of TCS, 42.94 of average cited reference per paper and h-index value is 36, he has occupied the second rank. The authors Lee JJ, Cross NCP, and Simon HU has published 55, 54 and 53 publications; with 2284, 3536 and 3443 TCS. The maximum records of 1625 publications produce by four authors (6500) which is followed by 1590 publications published by five authors (13.12%), 1540 records of six authors (12.71%) and 1407 records of three authors (11.61%) respectively. The highest number of 793 publications was produced in the year 2016 and lowest record output was observed in the year 1998 (444) respectively.

Few authors have produced less number of publications but they got a very good number of citations. The authors, Sheppard D, Locksley RM, Donaldson DD and Gilliland DG have published 5, 7, 9 and 8 records and their average citation per paper is 421.00, 322.00, 248.67 and 241.75 respectively. The records published in block wise, among top 50 authors, contributed 29 authors only in first block (1998-2002) and second

block (2003-2007) contributed 40 authors in third block (2008-2012) and 22 authors contributed in fourth block (2013-2017) respectively. The Group authors 'French Eosinophil Network', 'French Vasculitis Study Group' and 'Taiwan Severe Cutaneous Adverse' were contributed each 3 records in this research. Single authors have published 5.41 percent papers and the remaining 94.59 percent papers are multi authored. Our findings show that the authorship pattern alone but a complete scientometrics analysis using network analysis techniques on research output of Eosinophila study is essential in this present situation. This paper is expected to be useful for, to identify the top authors and a wide cross-section of researchers not restricted only to bibliometrics research.

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