11-2019

Analysis of Scholarly Publications on Bronchitis at Global Perspective: A Metric Study

S.Roselin Jahina
rosejsshaki@gmail.com

Dr. M.Sadik Batcha
Annamalai University

Analysis of Scholarly Publications on Bronchitis at Global Perspective: A Metric Study

S.Roselin Jahina, Research Scholar, Dept. of Library and Information Science, Annamalai University. E-mail – rosejsshaki@gmail.com.

Dr.M.Sadik Batcha, Mentor, Research Supervisor, Professor and University Librarian, Annamalai University. E-mail – msbau@gmail.com

Abstract

This research paper examines the validity of the use of bibliometric law for research on bronchitis literature worldwide. The various bibliometric laws of the lotka's law and Zipf's law in their mathematical expressions often present difficulties in adapting the observed values. The result indicates that the author's productivity according to Lotka's law is consistent with research on bronchitis literature worldwide. The law of the price square root is not applicable with the author's productivity information. Zipf's law was applied to identify publications about the frequency of word occurrence.

Keywords: *Zipf's Law, Lotka's Law, Price Square Root Law, Authorship Pattern*

Introduction

Bronchitis is an irritation occurs of the layer of your bronchial cylinders, which convey air from and to your lungs. Individuals who have bronchitis regularly hack up thickened bodily fluid, which can be stained. Bronchitis might be either intense or constant [(1)]. The Three empirical laws of Bibliometric are Lotka's law of productivity of Scientist [(2)], Scattering of Bradford's Law [(3)] and Frequency of word occurrence of zipf's law [(4)]. In this research has been taken only Zipf's law and Lotka's Law for analysis. The laws of Bradford's law, lotka's law and Zipf's law are the mainstay of scientometrics and so on.

Given that Price square root law is extensions of the Lotka's law to the fields of bronchitis, the production process of information, as generalized by Egghe and Rousseau [(5)], form part of the fundamentals of social sciences.

Review of Literature

Ye-sho Chen (1986)[(6)] examined the relationship among Bradford's law, zipf's law and Lotka's law square measure derived. The proof takes express account of the sequences of ascertained values of the variables by means that of an index. This approach leads to a additional realistic and precise formulation of every law.

David M.W.Powers (1998)[(7)] analysed that, word occurrence of zipf's law and explained in detailed. This research has relationship with frequency and rank of varied linguistics and social

units. It is also observed in language learning research of difference for the received version of Zipf's law.

Baskaran, C. & Sadik Batch, M (2012)[8] emphasized the research of cardiology, data accessed from MEDLINE database (1991-2010). In this period doubling time found to be growing and declining trend that is 0.70 and maximum score is 0.88. And also analysed this study for collaborative and authorship pattern of Cardiology research. Various statistical approaches also used in this study.

Sadik Batcha.M (2018)[9] revealed that the applicability of Lotka's Law on the worldwide dengue disease. This study measured that productivity of authors and tested lotka's value and this study k-s test fit for lotka's law.

Amsaveni. N and Sadik Batcha.M (2019)[10] determined that 2862 authors and 787 distributions retrieved in Advance in Geosciences journal publications. Analysed the authorship pattern and fit of lotka's law by publications by every scientist and applied the Chi- Square test to test found to be lotka's law fit to this study.

(Batcha & Ahmad, 2017)[11] analysed comparative analysis of Indian Journal of Information Sources and Services (IJISS) and Pakistan Journal of Library and Information Science (PJLIS) during 2011-2017 and studied various aspects like year wise distribution of papers, authorship pattern & author productivity, degree of collaboration pattern of Co-Authorship , average length of papers , average keywords, etc and found 138 (94.52%) of contributions from IJISS were made by Indian authors and similarly 94 (77.05) of contributions from PJLIS were done by Pakistani authors. Papers by Indian and Pakistani Authors with Foreign Collaboration are minimal (1.37% of articles) and (4.10% of articles) respectively.

(Batcha, Jahina, & Ahmad, 2018)[12] has examined scientometric analysis of the DESIDOC Journal and analyzed the pattern of growth of the research output published in the journal, pattern of authorship, author productivity, and, subjects covered to the papers over the period (2013-2017). It found that 227 papers were published during the period of study (2001-2012). The maximum numbers of articles were collaborative in nature. The subject concentration of the journal noted was Scientometrics. The maximum numbers of articles (65 %) have ranged their thought contents between 6 and 10 pages.

(Ahmad & Batcha, 2019)[13] analyzed research productivity in Journal of Documentation (JDoc) for a period of 30 years between 1989 and 2018. Web of Science database a service from Clarivate Analytics has been used to download citation and source data. Bibexcel and Histcite application software have been used to present the datasets. Analysis part focuses on the parameters like citation impact at local and global level, influential authors and their total output, ranking of contributing institutions and countries. In addition to this scientographical mapping of data is presented through graphs using VOSviewer software mapping technique.

(Ahmad, Batcha, Wani, Khan, & Jahina, 2017)[14] explored scientometric analysis of the Webology Journal. The paper analyses the pattern of growth of the research output published in the journal, pattern of authorship, author productivity, and subjects covered to the papers over the period (2013-2017). It was found that 62 papers were published during the period of study (2013-2017). The maximum numbers of articles were collaborative in nature. The subject concentration of the journal noted was Social Networking/Web 2.0/Library 2.0 and Scientometrics or Bibliometrics. Iranian researchers contributed the maximum number of articles (37.10%). The study applied standard formula and statistical tools to bring out the factual results.

(Ahmad & Batcha, 2019)[15] studied the scholarly communication of Bharathiar University which is one of the vibrant universities in Tamil Nadu. The study find out the impact of research produced, year-wise research output, citation impact at local and global level, prominent authors and their total output, top journals of publications, collaborating countries, most contributing departments and publication trends of the university during 2009 to 2018. The 10 years' publication data of the university indicate that a total of 3440 papers have been published from 2009 to 2018 receiving 38104 citations with h-index as 68. In addition the study used scientographical mapping of data and presented it through graphs using VOSviewer software mapping technique.

(Ahmad, Batcha, & Jahina, 2019)[16] quantitatively identified the research productivity in the area of artificial intelligence at global level over the study period of ten years (2008-2017). The study identified the trends and characteristics of growth and collaboration pattern of artificial intelligence research output. Average growth rate of artificial intelligence per year increases at the rate of 0.862. The multi-authorship pattern in the study is found high and the average number of authors per paper is 3.31. Collaborative Index is noted to be the highest range in the year 2014 with 3.50. Mean CI during the period of study is 3.24. This is also supported by the mean degree of collaboration at the percentage of 0.83 .The mean CC observed is 0.4635. Lotka's Law of authorship productivity is good for application in the field of artificial intelligence literature. The distribution frequency of the authorship follows the exact Lotka's Inverse Law with the exponent á = 2. The modified form of the inverse square law, i.e., Inverse Power Law with á and C parameters as 2.84 and 0.8083 for artificial intelligence literature is applicable and appears to provide a good fit. Relative Growth Rate [Rt(P)] of an article gradually increases from -0.0002 to 1.5405, correspondingly the value of doubling time of the articles Dt(P) decreases from 1.0998 to 0.4499 (2008-2017). At the outset the study reveals the fact that the artificial intelligence literature research study is one of the emerging and blooming fields in the domain of information sciences.

Methodology

The study accessed and downloaded the distribution records of the global productivity and word occurrence of frequency on Bronchitis research during 2009 to 2018 in the database of web of science. Total no of records 37478 were accessed and have analysed 134152 contributors. The

research also tries to adopt various indicators and test like Authorship pattern and Productivity, word occurrence Lotka's law, K-S test and Price Root Law. Bibexcel and Spreadsheet are helpful to analysis part. VOSviewer helps for mapping of word occurrence.

Objectives of the study

The study has set the following objectives:

- To study the Authorship pattern of Bronchitis disease during the years from 2009 to 2018.
- To examine the productivity of author in the field of worldwide Bronchitis Research.
- To analyse the word occurrence of frequency and adjudicate the applicability of Zipf's law on Bronchitis.
- To apply K-S test goodness of applicable for the conformity of Lotka's Law and also study whether the Price square root law is fit for this bronchitis research output.

Analysis and Interpretation

Authorship Pattern

Table – 1: Authorship Pattern of Bronchitis Research

Year/ Authors	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Grand Total	%
Single Author	225	207	201	178	195	161	209	229	206	156	1967	5.25
2 Authors	357	334	328	344	375	344	425	429	461	374	3771	10.06
3 Authors	332	403	410	438	437	395	537	565	538	478	4533	12.1
4 Authors	347	345	378	454	462	448	557	537	567	472	4567	12.19
5 Authors	339	364	384	394	457	455	531	541	536	473	4474	11.94
6 Authors	330	382	386	368	440	395	451	515	497	424	4188	11.17
7 Authors	255	262	319	316	328	346	366	393	425	364	3374	9
8 Authors	188	189	238	241	289	255	307	335	358	278	2678	7.15
9 Authors	125	138	172	152	181	175	210	251	254	225	1883	5.02
10 Authors	86	131	139	148	156	155	187	192	180	195	1569	4.19
Above 10 authors	215	276	335	389	469	453	554	608	617	558	4474	11.94
Total	2799	3031	3290	3422	3789	3582	4334	4595	4639	3997	37478	100

Table No.1 analyse that the year wise authorship pattern of publications on Bronchitis Research. It shows year wise authorship pattern consisting single author, multiple authorship such as from

two authors to ten plus. As per the result depicted in Table 1, the highest number of paper published in Ten years period from 2009-2018 is by the group of authors consisting Four a total of 4533 (12.1%) of total publications, followed by group of three authors, a total of 4533 (12.1%) of total publications and the third highest contribution comes from the group of five authors, a total of 4474 (11.94%) of the distributions. 1569 (4.19%) of total distribution comes from the group of ten authors and the single author contributes 1967(5.25%) of total distributions. In this table it is clearly reveals that the Research output depends on the collaborative efforts rather than individual. This finding is further supported by the table 2.

Collaborative Measures

Table – 2: Collaborative Measures

Year	No.of.Articles	Total No. of Authors	Collaborative Index	Degree of Collaboration
2009	2799	15286	0.18	0.92
2010	3031	17470	0.17	0.93
2011	3290	19748	0.17	0.94
2012	3422	21248	0.16	0.95
2013	3789	23836	0.16	0.95
2014	3582	23155	0.15	0.96
2015	4334	29197	0.15	0.95
2016	4595	31220	0.15	0.95
2017	4639	30681	0.15	0.96
2018	3997	28921	0.14	0.96
Grand Total	**37478**	**240762**	**0.16**	**0.95**

The formula given by K. Subramanyam was used.

$$\text{Degree of Collaboration} = \frac{NM}{NM+NS}$$

NM= Number of Multiple Authors

NS= Number of Single Author

$$\text{Collaborative Index} = \frac{Total\ Paper}{Total\ Author}$$

Collaborative measures such as number of authors, collaborative index and Degree of Collaboration are given in this table. The DC average value average value is 0.95. The collaborative index shows an increasing trend 0.92 to 0.96 from 2009 to 2018. In this study found to be 0.16, which shows level of Collaborative Index.

Author productivity and the application of Lotka's Law

Table – 3: Lotka's Law of Scientific Author Productivity

Documents	Authors	X=Logx	Y=Logy	XY	X2
1	96277	-	4.984	0	0
2	19431	0.301	4.288	1.291	0.091
3	7201	0.477	3.857	1.840	0.228
4	3575	0.602	3.553	2.139	0.362
5	2271	0.699	3.356	2.346	0.489
6	1323	0.778	3.122	2.429	0.606
7	886	0.845	2.947	2.491	0.714
8	656	0.903	2.817	2.544	0.816
9	472	0.954	2.674	2.552	0.911
10	378	1.000	2.577	2.577	1.000
11	276	1.041	2.441	2.542	1.084
12	206	1.079	2.314	2.497	1.165
13	176	1.114	2.246	2.501	1.241
14	132	1.146	2.121	2.430	1.314
15	122	1.176	2.086	2.454	1.383
16	96	1.204	1.982	2.387	1.450
17	84	1.230	1.924	2.368	1.514
18	68	1.255	1.833	2.300	1.576
19	64	1.279	1.806	2.310	1.635
20	61	1.301	1.785	2.323	1.693
21	45	1.322	1.653	2.186	1.748
22	37	1.342	1.568	2.105	1.802
23	37	1.362	1.568	2.135	1.854
24	25	1.380	1.398	1.929	1.905
25	28	1.398	1.447	2.023	1.954
26	12	1.415	1.079	1.527	2.002
27	7	1.431	0.845	1.210	2.049
28	21	1.447	1.322	1.913	2.094
29	20	1.462	1.301	1.903	2.139
30	11	1.477	1.041	1.538	2.182
31	14	1.491	1.146	1.709	2.224

32	7	1.505	0.845	1.272	2.265
33	13	1.519	1.114	1.692	2.306
34	10	1.531	1.000	1.531	2.345
35	14	1.544	1.146	1.770	2.384
36	8	1.556	0.903	1.405	2.422
37	6	1.568	0.778	1.220	2.459
38	8	1.580	0.903	1.427	2.496
39	4	1.591	0.602	0.958	2.531
40	2	1.602	0.301	0.482	2.567
41	1	1.613	0	0	2.601
42	2	1.623	0.301	0.489	2.635
43	1	1.633	0	0	2.668
44	3	1.643	0.477	0.784	2.701
45	6	1.653	0.778	1.286	2.733
46	6	1.663	0.778	1.294	2.765
47	2	1.672	0.301	0.503	2.796
48	4	1.681	0.602	1.012	2.827
49	1	1.690	0	0	2.857
50	3	1.699	0.477	0.811	2.886
52	2	1.716	0.301	0.517	2.945
53	4	1.724	0.602	1.038	2.973
54	2	1.732	0.301	0.522	3.001
55	3	1.740	0.477	0.830	3.029
56	1	1.748	0	0	3.056
57	1	1.756	0	0	3.083
58	2	1.763	0.301	0.531	3.110
59	1	1.771	0	0	3.136
61	1	1.785	0	0	3.187
62	3	1.792	0.477	0.855	3.213
63	1	1.799	0	0	3.238
64	2	1.806	0.301	0.544	3.262
66	1	1.820	0	0	3.311
67	2	1.826	0.301	0.550	3.335
69	2	1.839	0.301	0.554	3.381
71	3	1.851	0.477	0.883	3.427
72	1	1.857	0	0	3.450
84	1	1.924	0	0	3.703
85	1	1.929	0	0	3.723
86	2	1.934	0.301	0.582	3.742
88	1	1.944	0	0	3.781
91	1	1.959	0	0	3.838

98	1	1.991	0	0	3.965
Grand Total	**134152**	**106.494**	**84.532**	**89.843**	**167.356**

Productivity of author in the field of Bronchitis shows that out of 134152 authors, the single output has given by 96277 authors. They have produced single article, 19431 produced two articles. The distribution of authors more than 72 articles is found to be quiet small.

The testing of Lotka's law is determined the value of n

$$n = \frac{73(89.843)-(106.494)(84.532)}{73(167.356)-(106.494)^2}$$

$$\mathbf{n=} \frac{-2443.611808}{876.015964} \qquad n= 2.7894$$

Table -4: Kolmogorov-Smirnov Test

Contributions	Contributors	Observed =yx/∑yx	Value =∑(yx/∑yx	Expected Frequency	Value of Frequency/Cum	Diff(D)
1	96277	0.71767	0.71767	0.79860	0.79860	-0.08093
2	19431	0.14484	0.86251	0.11551	0.91411	0.02933
3	7201	0.05368	0.91619	0.03728	0.95139	0.01640
4	3575	0.02665	0.94284	0.01671	0.96810	0.00994
5	2271	0.01693	0.95977	0.00897	0.97707	0.00796
6	1323	0.00986	0.96963	0.00539	0.98246	0.00447
7	886	0.00660	0.97624	0.00351	0.98597	0.00310
8	656	0.00489	0.98113	0.00242	0.98838	0.00247
9	472	0.00352	0.98464	0.00174	0.99012	0.00178
10	378	0.00282	0.98746	0.00130	0.99142	0.00152
11	276	0.00206	0.98952	0.00099	0.99241	0.00106
12	206	0.00154	0.99105	0.00078	0.99319	0.00076
13	176	0.00131	0.99237	0.00062	0.99382	0.00069
14	132	0.00098	0.99335	0.00051	0.99433	0.00048
15	122	0.00091	0.99426	0.00042	0.99474	0.00049
16	96	0.00072	0.99498	0.00035	0.99509	0.00037
17	84	0.00063	0.99560	0.00030	0.99539	0.00033
18	68	0.00051	0.99611	0.00025	0.99564	0.00026
19	64	0.00048	0.99659	0.00022	0.99586	0.00026
20	61	0.00045	0.99704	0.00019	0.99605	0.00027
21	45	0.00034	0.99738	0.00016	0.99621	0.00017
22	37	0.00028	0.99765	0.00014	0.99635	0.00013
23	37	0.00028	0.99793	0.00013	0.99648	0.00015
24	25	0.00019	0.99811	0.00011	0.99659	0.00007

25	28	0.00021	0.99832	0.00010	0.99669	0.00011
26	12	0.00009	0.99841	0.00009	0.99678	0.00000
27	7	0.00005	0.99846	0.00008	0.99686	-0.00003
28	21	0.00016	0.99862	0.00007	0.99694	0.00008
29	20	0.00015	0.99877	0.00007	0.99700	0.00008
30	11	0.00008	0.99885	0.00006	0.99707	0.00002
31	14	0.00010	0.99896	0.00006	0.99712	0.00005
32	7	0.00005	0.99901	0.00005	0.99717	0.00000
33	13	0.00010	0.99911	0.00005	0.99722	0.00005
34	10	0.00007	0.99918	0.00004	0.99726	0.00003
35	14	0.00010	0.99928	0.00004	0.99730	0.00006
36	8	0.00006	0.99934	0.00004	0.99734	0.00002
37	6	0.00004	0.99939	0.00003	0.99737	0.00001
38	8	0.00006	0.99945	0.00003	0.99740	0.00003
39	4	0.00003	0.99948	0.00003	0.99743	0.00000
40	2	0.00001	0.99949	0.00003	0.99746	-0.00001
41	1	0.00001	0.99950	0.00003	0.99748	-0.00002
42	2	0.00001	0.99952	0.00002	0.99751	-0.00001
43	1	0.00001	0.99952	0.00002	0.99753	-0.00001
44	3	0.00002	0.99955	0.00002	0.99755	0.00000
45	6	0.00004	0.99959	0.00002	0.99757	0.00003
46	6	0.00004	0.99963	0.00002	0.99759	0.00003
47	2	0.00001	0.99965	0.00002	0.99760	0.00000
48	4	0.00003	0.99968	0.00002	0.99762	0.00001
49	1	0.00001	0.99969	0.00002	0.99764	-0.00001
50	3	0.00002	0.99971	0.00001	0.99765	0.00001
52	2	0.00001	0.99972	0.00001	0.99766	0.00000
53	4	0.00003	0.99975	0.00001	0.99768	0.00002
54	2	0.00001	0.99977	0.00001	0.99769	0.00000
55	3	0.00002	0.99979	0.00001	0.99770	0.00001
56	1	0.00001	0.99980	0.00001	0.99771	0.00000
57	1	0.00001	0.99981	0.00001	0.99772	0.00000
58	2	0.00001	0.99982	0.00001	0.99773	0.00001
59	1	0.00001	0.99983	0.00001	0.99774	0.00000
61	1	0.00001	0.99984	0.00001	0.99775	0.00000
62	3	0.00002	0.99986	0.00001	0.99775	0.00001
63	1	0.00001	0.99987	0.00001	0.99776	0.00000
64	2	0.00001	0.99988	0.00001	0.99777	0.00001
66	1	0.00001	0.99989	0.00001	0.99778	0.00000
67	2	0.00001	0.99990	0.00001	0.99778	0.00001
69	2	0.00001	0.99992	0.00001	0.99779	0.00001

71	3	0.00002	0.99994	0.00001	0.99779	0.00002
72	1	0.00001	0.99995	0.00001	0.99780	0.00000
84	1	0.00001	0.99996	0.00000	0.99780	0.00000
85	1	0.00001	0.99996	0.00000	0.99781	0.00000
86	2	0.00001	0.99998	0.00000	0.99781	0.00001
88	1	0.00001	0.99999	0.00000	0.99781	0.00000
91	1	0.00001	0.99999	0.00000	0.99782	0.00000
98	1	0.00001	1.00000	0.00000	0.99782	0.00001
Grand Total	**134152**					

This table is built with the purpose to submit the data observed to a statistics test, to verify the significance value. At this case a study apply the K-S test.

The difference maximum between the cumulative distributions, Dmax is 0.02933. The value of n and were calculated to be 0.7986 and 0.02933 respectively. The K-S test one sample of applicable test was performed at the 0.10 level of significance. The Dmax value is 0.02933. The critical value is greater than the Dmax (0.02933). The Lotka's law is applicable to Bronchitis research.

Price's Square Root Law

In order to validate whether or not the distribution standing of authors fulfill price's root law and also the calculation relies on:

$$\text{Price's Square Root Law} = \quad \sqrt{N} = 490.5853$$

$$N = 240674$$

Table – 5: Price's Square Root Law for Bronchitis Research

Documents A	Authors B	% of 134152	A×B	% of A×B	% Cum.of A×B	Cum.of A×B
98	1	0.001	98	0.04	0.08	-
91	1	0.001	91	0.04	0.12	189
88	1	0.001	88	0.04	0.15	277
86 (449)	**2**	**0.001(0.004)**	**172(449)**	**0.07(0.22)**	**0.22**	**449**
85	1	0.001	85	0.04	0.26	534
84	1	0.001	84	0.03	0.29	618
72	1	0.001	72	0.03	0.32	690
71	3	0.002	213	0.09	0.41	903
69	2	0.001	138	0.06	0.47	1041
67	2	0.001	134	0.06	0.53	1175
66	1	0.001	66	0.03	0.55	1241

64	2	0.001	128	0.05	0.61	1369
63	1	0.001	63	0.03	0.63	1432
62	3	0.002	186	0.08	0.71	1618
61	1	0.001	61	0.03	0.74	1679
59	1	0.001	59	0.02	0.76	1738
58	2	0.001	116	0.05	0.81	1854
57	1	0.001	57	0.02	0.83	1911
56	1	0.001	56	0.02	0.86	1967
55	3	0.002	165	0.07	0.92	2132
54	2	0.001	108	0.04	0.97	2240
53	4	0.003	212	0.09	1.06	2452
52	2	0.001	104	0.04	1.10	2556
50	3	0.002	150	0.06	1.16	2706
49	1	0.001	49	0.02	1.18	2755
48	4	0.003	192	0.08	1.26	2947
47	2	0.001	94	0.04	1.30	3041
46	6	0.004	276	0.11	1.42	3317
45	6	0.004	270	0.11	1.53	3587
44	3	0.002	132	0.05	1.58	3719
43	1	0.001	43	0.02	1.60	3762
42	2	0.001	84	0.03	1.64	3846
41	1	0.001	41	0.02	1.65	3887
40	2	0.001	80	0.03	1.69	3967
39	4	0.003	156	0.06	1.75	4123
38	8	0.006	304	0.13	1.88	4427
37	6	0.004	222	0.09	1.97	4649
36	8	0.006	288	0.12	2.09	4937
35	14	0.010	490	0.20	2.29	5427
34	10	0.007	340	0.14	2.43	5767
33	13	0.010	429	0.18	2.61	6196
32	7	0.005	224	0.09	2.71	6420
31	14	0.010	434	0.18	2.89	6854
30	11	0.008	330	0.14	3.02	7184
29	20	0.015	580	0.24	3.26	7764
28	21	0.016	588	0.24	3.51	8352
27	7	0.005	189	0.08	3.59	8541
26	12	0.009	312	0.13	3.72	8853
25	28	0.021	700	0.29	4.01	9553
24	25	0.019	600	0.25	4.26	10153
23	37	0.028	851	0.35	4.61	11004
22	37	0.028	814	0.34	4.95	11818

21	45	0.034	945	0.39	5.34	12763
20	61	0.045	1220	0.51	5.85	13983
19	64	0.048	1216	0.51	6.35	15199
18	68	0.051	1224	0.51	6.86	16423
17	84	0.063	1428	0.59	7.45	17851
16	96	0.072	1536	0.64	8.09	19387
15	122	0.091	1830	0.76	8.85	21217
14	132	0.098	1848	0.77	9.62	23065
13	176	0.131	2288	0.95	10.57	25353
12	206	0.154	2472	1.03	11.60	27825
11	276	0.206	3036	1.26	12.86	30861
10	378	0.282	3780	1.57	14.43	34641
9	472	0.352	4248	1.77	16.20	38889
8	656	0.489	5248	2.18	18.38	44137
7	886	0.660	6202	2.58	20.95	50339
6	1323	0.986	7938	3.30	24.25	58277
5	2271	1.693	11355	4.72	28.97	69632
4	3575	2.665	14300	5.94	34.91	83932
3	7201	5.368	21603	8.98	43.89	105535
2	19431	14.484	38862	16.15	60.03	144397
1	96277	71.767	96277	40.00	100	240674
Total	**134152**	**100**	**240674**	**100**		

Based on this law, the only one author produced 98, 91, 88, 85, 84, 72, 66, 63, 61, 59, 57, 56, 49, 43 and 41 numbers of articles by single author distributions, the price square root value situated at 0.22 percent of publications. The author percentage of 449 (closed root value of 240674) authors is places at 0.22 percent of distributions. The value is incredibly far-flung from 50%, therefore this result's not in compliance with price root law.

Zipf's Law

This law applies, the words were retrieved from the title of the articles and stratified consistent with their frequency of occurrence in decreasing order. Only those prime twenty five words occupying frequency up to 46118 things area unit given during this table. It had been found that log of frequency of occurrence of words once side to log of their rank; it shows that every word is that the same results.

Rf = c. (where c is constant).

Word – Children

Frequency – 3568

Rank – 1

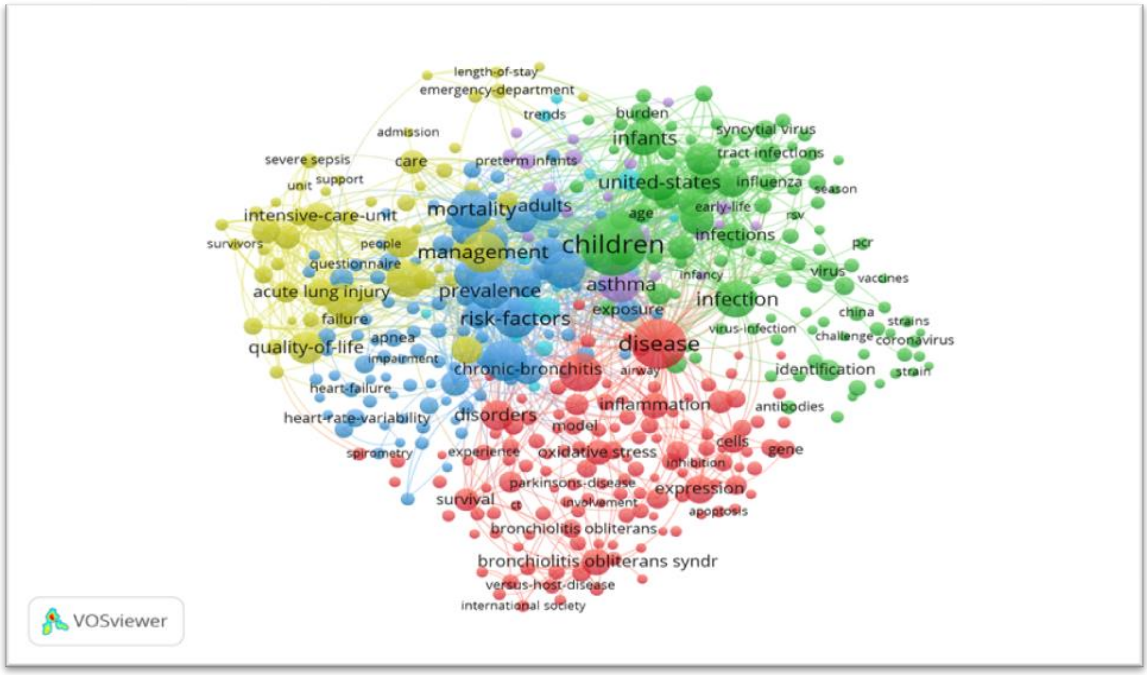
Log 3568 + Log 1

3.55 + 0 = 3.55 word, it is demonstrate that Zipf's law is valid.

Table – 6: Ranking of word occurrence in Zipf's Law

S.No	Word	Recs(F)	Rank (C)	Log F	Log R	Log C
1	Children	3568	1	3.55	0.00	3.55
2	Disease	2510	2	3.40	0.30	3.70
3	Obstructive Pulmonary-Disease	1739	3	3.24	0.47	3.71
4	Management	1581	4	3.20	0.60	3.80
5	Risk-Factors	1489	5	3.17	0.69	3.86
6	Infection	1484	6	3.17	0.77	3.94
7	Asthma	1478	7	3.17	0.84	4.01
8	Mortality	1436	8	3.16	0.90	4.06
9	Diagnosis	1419	9	3.16	0.95	4.11
10	Prevalence	1384	10	3.14	1.00	4.14
11	Risk	1346	11	3.13	1.04	4.17
12	United-States	1335	12	3.12	1.07	4.19
13	Respiratory-Distress-Syndrome	1288	13	3.11	1.11	4.22
14	Infants	1277	14	3.11	1.14	4.25
15	Randomized Controlled-Trial	1221	15	3.09	1.17	4.26
16	Young-Children	1100	16	3.04	1.20	4.24
17	Quality-Of-Life	1060	17	3.02	1.23	4.25
18	Disorders	1011	18	3.00	1.25	4.25
19	Chronic-Bronchitis	1010	19	3.00	1.27	4.27
20	Adults	982	20	2.99	1.30	4.29
21	Bronchiolitis	975	21	2.99	1.32	4.31
22	Illness	961	22	2.98	1.34	4.32
23	Health	906	23	2.96	1.36	4.32
24	Outcomes	856	24	2.90	1.38	4.28
25	Expression	815	25	2.90	1.39	4.29

Figure – 1: Mapping of Word occurrence



This figure shows that co-occurrence frequency of words, Children is the most frequency of this research and it's connected with other frequencies and followed by Disease. This is clearly given in the Table-6.

Findings and Conclusion

This study reveals that Bibliometric laws such as Zipf's law, frequency of word and Lotka's law of author productivity. The records 37478 were retrieved from Web of science. The open source tool bibexcel was used to analyse the records. 1, 34,152 authors contributed 37,478 publications. As per the result depicted in Authorship pattern, highest number of paper published in Ten years period from 2009-2018 is by group consisting of Four authors, total of 4533 (12.1%) of total publications, followed by group of three authors, total of 4533 (12.1%) of total publications and third highest contribution comes from group of five authors, total of 4474 (11.94%) of the distributions. 1569 (4.19%) of total distribution comes from group of ten authors and single author contributes 1967(5.25%) of total distributions.

The word occurrence of Zipf's law applying top 25 frequencies, First ranks of frequency for Children were 3568 (3.55). This research conclude that, the Lotka's law finally fit for this study because, The Dmax value is 0.02933 and this value greater than critical value and Price Square Root law is not applicable for this study.

The increasing trend towards joint authorship is leading as related to solo authorship in case of Bronchitis research in global level.

References

1. https://www.mayoclinic.org/diseases-conditions/bronchitis/symptoms-causes/syc-20355566

2. Lotka, A.J (1926). The frequency of distribution of scientific productivity. *Journal of the Washington Academy of Science,* 16(12), 317-323.

3. Bradford, S.C (1934). Sources of information on specific subjects. *Engineering,* 137, 85-86.

4. Zipf's, G.K (1949). Human Behaviour and the principle of Least Effort. Cambridge, MA: Addison-Wesley.

5. Egghe, L. (1990). Applications of the theory of Bradford's law to the calculation of Leimkuhler's law and to the completion of bibliographies. *Journal of American Society for Information Science*, 41:469–492

6. Ye-sho Chen (1986). A Relationship between Lotka's Law, Bradford's Law, and Zipf's Law. *Journal of the American Society for information science,* 37(5), 307-314.

7. David M.W.Powers (1998). Applications and Explanations of Zipf's Law. New methods in Language processing and computational natural language learning, 151-160.

8. Baskaran, C. & Batch, M S. (2012). Publications Pattern and Author Collaboration of Cardiology Research. *SERLS Journal of Information Management*, 49(2), 199-207.

9. Batcha, M. S. (2018). Lotka's Applicability on Global Dengue research Publication: A Scienctometric Study. *DESIDOC Journal of Library and Information Technology*, 38(4), 266-270.

10. Amsaveni, N. & Batcha, M S. (2019). Applicability if Lotka's Law in the journal of advances in Geosciences publications: A Scientometric study. *International Journal of Information Dissemination and Technology,* 9(2), 70-73.

11. Batcha, M. S., & Ahmad, M. (2017). Publication Trend in an Indian Journal and a Pakistan Journal : A Comparative Analysis using Scientometric Approach. *Journal of Advances in Library and Information Science*, *6*(4), 442–449.

12. Batcha, M. S., Jahina, S. R., & Ahmad, M. (2018). Publication Trend in DESIDOC Journal of Library and Information Technology during 2013-2017 : A Scientometric Approach. *International Journal of Research in Engineering, IT and Social Sciences*, *8*(4), 76–82.

13. Ahmad, M., & Batcha, M. S. (2019). Mapping of Publications Productivity on Journal of Documentation 1989-2018 : A Study Based on Clarivate Analytics – Web of Science

Database. *Library Philosophy and Practice (E-Journal)*, 2213–2226. Retrieved from https://digitalcommons.unl.edu/libphilprac/2213/

14. Ahmad, M., Batcha, M. S., Wani, B. A., Khan, M. I., & Jahina, S. R. (2017). Research Output of Webology Journal (2013-2017): A Scientometric Analysis. *International Journal of Movement Education and Social Science*, *7*(3), 46–58.

15. Ahmad, M., & Batcha, M. S. (2019). Scholarly Communications of Bharathiar University on Web of Science in Global Perspective : A Scientometric Assessment. *Research Journal of Library and Information Science*, *3*(3), 22–29.

16. Ahmad, M., Batcha, M. S., & Jahina, S. R. (2019). Testing Lotka ' s Law and Pattern of Author Productivity in the Scholarly Publications of Artificial Intelligence. *Library Philosophy and Practice (E-Journal)*. Retrieved from https://digitalcommons.unl.edu/libphilprac/2716