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Kongunadu Arts and Science College, Coimbatore.

AUTHORSHIP PATTERNS AND COLLABORATIVE RESEARCH OF ONCOLOGY RESEARCH OUTPUT IN INDIA: A SCIENTOMETRICS STUDY

Senthilkumar, R*. and M. Muthukrishnan
Head of Research Department of Library and Information Science, Kongunadu Arts and Science College, Coimbatore – 641 029.
*E.mail: kasclibrary@yahoo.com

ABSTRACT

The paper analysis authorship patterns and collaborative research of oncology research in Indiaas reflected by the research papers listed in Web of Science database for a period of 11 years from 2005-2015. The increased trend towards multiple authorship is predominant as compare to single authorship in case of oncology in India.In the study, the degree of collaboration was not a constant value, it reveals varies of 0.03 to 0.16 percent and the mean quality as 0.09. The analysis found that single author papers maintained a low profile among oncology research scientists and the multi authorship pattern is expanding slowly in Indian oncology research.

Keywords: Authorship pattern, Degree of collaboration, Time Series Analysis, Oncology, Scientometrics.

1. INTRODUCTION

One of the preeminent fundamental requirements for advancement in medical and scholarly vocations is the authorship of scientific papers.Collaborative authorship has been a trademark highlight of the present day medical science and there has been a predictable pattern towards expanded collaboration in all the branches of sciences. Multiple authorship and cooperation are among the most critical necessities of exploratory and innovative work today.

A percentage of the writings are evaluated by the authors before conducting the present study.By observing the authorship patterns to be measurably essentially connected with publication in high ranking journals. Consideration of professors, research scholars, and scientists as authors, specifically, were all emphatically connected with publication in high ranking journals.SudhierPillai,K G (2007) have describedThe study revealed that team research is predominant in journal articles while solo research is the trend in the case of books Elango and Rajendran (2012)briefed information that multi authored contributions are dominated in the field of marine sciences. Average collaboration rate (0.57) is better collaboration and mean number of authors per joint authored paper is 3.4. Andras Pinter (2013) examined the authorship patterns in the articles published in the Journal of Pediatric Surgery (JPS) and found that thepercentage of papers with less than 3 authors significantly declined, whereas those with 4 to 5 authors did not change. Manuscripts with more than 6 authors significantly increased. Pallab Pradhan *et al.* (2013) studied the authorship Pattern and Degree of Collaboration in Indian Chemistry Literature. The study found that the researchers in chemistry are keen towards team research or group research rather than solo research.

Goyal *et al.* (2013) have analyzed the tendency in the direction of collaborative research is seen steady during 2002-2011 in the field of Chemical Sciences. Outcome of study clearly show that authorship trend is moving on the way to multiple authorship and degree of collaboration is found to be high.

Michael *et al*. (2014) examined the enrichment of co-authorship patterns with author scientific profiles helps uncover associations between author team characteristics and appearance in high-impact journals. Navaneethakrishnan (2014) the analysis revealed that the majority of the publications are contributed by multiple authors. Degree of collaboration was progressively increased over the study span. Neena Kapoor *et al*. (2014) has described the study demonstrates that the average number of authors per publication dramatically increased from 1980 to 2013 in major radiology journals. Chandran and Natarajan (2015) have briefed the highest number of contributions were multi authored papers. It is found that that the degree of collaboration ranges from 0.36 to 0.77 and the average degree of collaboration is 0.59(9). Mehmet Ali Koseoglu (2016) indicated, the authorship pattern of the SMJ shows multi- authored articles dominated solo work, and this domination increased over the past periods; however, the

growth of multi- authored articles is limited to papers with two or three authors. Senthilkumar and Muthukrishnan (2016) the analysis revealed that the more research papers are being contributed under multiple authorship.

Here, the author has made an attempt to study the authorship pattern, collaborative researchand country of the corresponding author on oncology literature published during the period 2005- 2015 and indexed in web of science database.

2. OBJECTIVES

The objectives of the study are brief as follows:

- ✓ To study the year wise distribution of oncology research output in India.
- ✓ To study authorship pattern in oncology literature
- ✓ To study the year wise single and multi-authored Papers
- ✓ To study the degree of collaboration in the field of oncology
- ✓ To study the time series analysisin the field of oncology

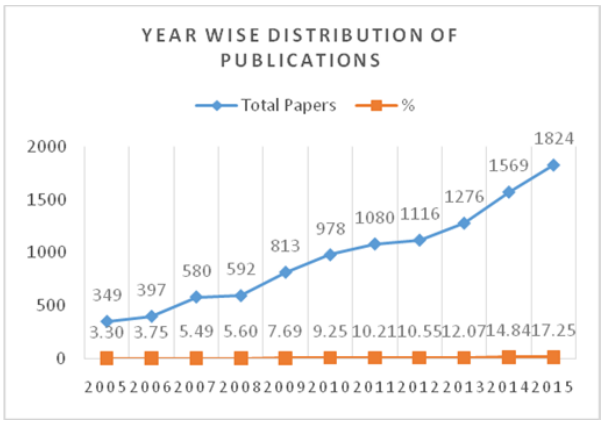
3. DATA ANALYSIS

Data was downloaded on 02nd May 2016 for a period of eleven years (2005-2015) from the Web of Science (WoS) of the Thomson Reuters, USA.The search keyword has 'oncology' has been used for the purpose of collection of data. The size of the sample downloaded for the purpose is 10574. The downloaded records was enriched with different parameters like authors, title, years, research institutions, document type and so on. Further the records analyzed by using Histcite and bibexcel software application.

Table 1. Year Wise Distribution of Publications

S No	Year	Total Papers	%
1.	2005	349	3.30
2.	2006	397	3.75
3.	2007	580	5.49
4.	2008	592	5.60
5.	2009	813	7.69
6.	2010	978	9.25
7.	2011	1080	10.21
8.	2012	1116	10.55
9.	2013	1276	12.07
10.	2014	1569	14.84
11.	2015	1824	17.25
	Total	10574	100.00

Graph 1. Year Wise Distribution of Publications



Here, an effort was made to analyzefor the period of eleven years from 2005-2015. Table-1 and Graph-1 present the year-wise distribution of number of publications indexed in WoS database.The average number of article publication was 961.27 articles per year.It has been realized a steady growth of Indian research output in oncology from 2005 onwards.In the study, the commitment of prior five years (2005-2010) was less than the average publications per year.Out of 10574 articles 1824 (17.25%) articles were published in 2015 and 349 (3.30%) articles were in 2005, which are highest and lowermost in eleven years respectively.

4. AUTHORSHIP PATTERNS

The below table 1 reveals that a total of 61207 authors have contributed the 10574 articles and the average number of authors per article observed to be 5.79. Among 10574 articles, 595(5.63%) articles are written by single author and 9979 (94.37%) articles are written by multiple authors.

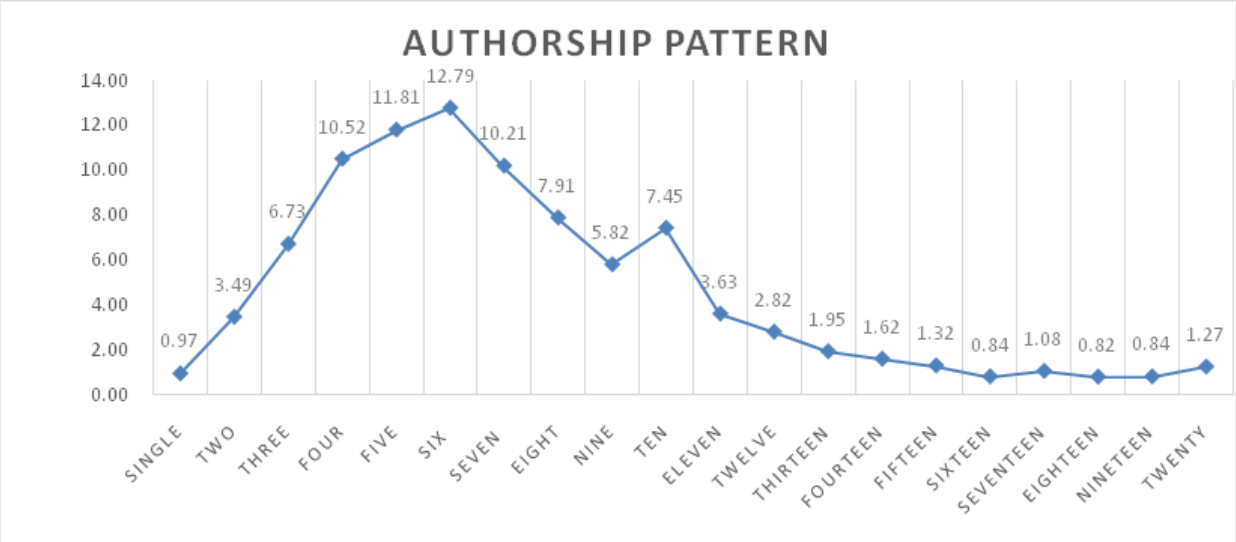
Four authored articles involved highest percentage 1610 (15.23%), after Five authored articles 1446(13.68%) of the aggregate 10574 articles and six to Twelve authored contributions are between 13 to 1 percent. Above Twelve authored contributions are below one percent of articles.

In this manner, showing unmistakably the increased trend towards multiple authorship is predominant as compare to single authorship in case of oncology in India. The above graph demonstrates that the diminishing patterns in the quantity of authors as far as group or team research with respect to more than six authors.

Table 2. Presenting the authorship pattern in oncology research output.

S.No.	No. of Authors	No. of Publications	%	Authorship pattern	%
1.	Single	595	5.63	595	0.97
2.	Two	1067	10.09	2134	3.49
3.	Three	1374	12.99	4122	6.73
4.	Four	1610	15.23	6440	10.52
5.	Five	1446	13.68	7230	11.81
6.	Six	1305	12.34	7830	12.79
7.	Seven	893	8.45	6251	10.21
8.	Eight	605	5.72	4840	7.91
9.	Nine	396	3.75	3564	5.82
10.	Ten	456	4.31	4560	7.45
11.	Eleven	202	1.91	2222	3.63
12.	Twelve	144	1.36	1728	2.82
13.	Thirteen	92	0.87	1196	1.95
14.	Fourteen	71	0.67	994	1.62
15.	Fifteen	54	0.51	810	1.32
16.	Sixteen	32	0.30	512	0.84
17.	Seventeen	39	0.37	663	1.08
18.	Eighteen	28	0.26	504	0.82
19.	Nineteen	27	0.26	513	0.84
20.	Twenty	39	0.37	780	1.27
21.	Twenty+	99	0.94	3719	6.08
	Total	10574	100.00	61207	100

Graph 2. Presenting the authorship pattern in oncology research output



5. DEGREE OF AUTHOR'S COLLABORATION

The degree of collaboration varies from one discipline to another. It is generally high in the intensely collaborative scientific and technical fields, but low in the humanities. The formula given by K Subramanyam (Subramanyam, 1983) is useful for determining the degree of collaboration in quantitative terms. The mathematical deduction of the formula is

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

Where, C = Degree of collaboration in a discipline

Nm = number of multi-authored papers in the discipline

Ns = number of single-authored papers in the discipline

Table 3. Degree of Collaboration

S.No.	Year	Single Author	%	Multi Authors	%	DC
1.	2005-2015	595	5.63	9979	94.37	0.94

Here, Nm = 9979

Ns = 595

$$C = \frac{9979}{9979 + 595}$$

$= 0.94$, Thus, the degree of collaboration (C) is 0.94

The analysis of Table -3 shows that the degree of collaboration during the period of 11 years (2005-2015) is 0.94. The single authored articles are covered only 595 (5.63%) during the years. The multi authored articles 9979 (94.37%) are maximumthroughout the years. which obviously shows its strength upon multi authored collaborative research.However, when we analysis the year-wise degree of collaboration for 11 years, the outcomes arise different.

The Table4 speaks to the year wise number of multiauthored articles and their degree ofcollaboration. In the study, the degree of collaboration was not a constant value, it reveals varies of 0.03 to 0.16percent and the mean quality as 0.09.The analysis found that single author papers maintained a low profile among oncology research scientists and the multi authorship pattern is expanding slowly in Indian oncology research.

Table 4. Year Wise Degree of Collaboration

S.No.	Year	No of Articles	No. of Authors	SAP*	%	MAP*	%	DC
1	2005	349	1179	20	0.19	329	3.11	0.03
2	2006	397	1473	28	0.26	369	3.49	0.03
3	2007	580	2004	32	0.30	548	5.18	0.05
4	2008	592	1925	49	0.46	543	5.14	0.05
5	2009	813	2515	37	0.35	776	7.34	0.07
6	2010	978	3245	50	0.47	928	8.78	0.09
7	2011	1080	3578	84	0.79	996	9.42	0.09
8	2012	1116	4112	69	0.65	1047	9.90	0.10
9	2013	1276	4471	45	0.43	1231	11.64	0.12
10	2014	1569	5752	96	0.91	1473	13.93	0.14
11	2015	1824	6349	85	0.80	1739	16.45	0.16
	Total	10574	36603	595	5.63	9979	94.37	0.09 Mean

*SAP = Single Authored Paper, *MAP = Multi Authored Papers, *DC = Degree of Collaboration

6. TIME SERIES ANALYSIS

Table 5. Time Series Analysis

S.No.	Year	SAP(Y)	X	X^2	XY	MAP (Y)	XY	CP(Y)	XY
1.	2005	20	-5	25	-100	329	-1645	349	-1745
2.	2006	28	-4	16	-112	369	-1476	397	-1588
3.	2007	32	-3	9	-96	548	-1644	580	-1740
4.	2008	49	-2	4	-98	543	-1086	592	-1184
5.	2009	37	-1	1	-37	776	-776	813	-813
6.	2010	50	0	0	0	928	0	978	**0**
7.	2011	84	1	1	84	996	996	1080	1080
8.	2012	69	2	4	138	1047	2094	1116	2232
9.	2013	45	3	9	135	1231	3693	1276	3828

10.	2014	96	4	16	384	1473	5892	1569	6276
11.	2015	85	5	25	425	1739	8695	1824	9120
	Total	595	0	110	723	9979	14743	10574	15466

*SAP = Single Authored Paper, *MAP = Multi Authored Papers, *CP = Collaborative Papers (Y)

7. SINGLE AUTHORED PUBLICATIONS: TIME SERIES ANALYSIS

Straight line equation is applied to arrive at projections for future growth under Time Series analysis. Straight Line equation Yc = a+bX since Σx = 0, a=ΣY/N, ΣY = (Total Number of Paper by Single Author), N = (Number of Years), a = 595/11, a = 54.09, b=ΣXY/Σ, ΣXY = (Total of XY Tables), Σ = (Total of X2 Table), b=723/110, b=6.57.

Estimated literature in 2020 is, When X = 2020-2010(Mid-Year), X = 10,

Apply Straight line equation, Yc = a+bX since Σx = 0, Yc = 54.09+6.57*10, Y

c = 54.09+65.7,

Yc = 119.79

8. MULTI AUTHORED PUBLICATIONS: TIME SERIES ANALYSIS

Straight Line equation Yc = a+bX since Σx = 0, a=ΣY/N, ΣY = (Total Number of Paper by Multi Author), N = (Number of Years), a = 9979/11, a = 907.18, b=ΣXY/Σ, ΣXY = (Total of XY Tables), Σ = (Total of X2 Table), b = 14743/110, b = 134.02.

Estimated literature in 2020 is, When X = 2020-2010(Mid-Year) X = 10,

Apply Straight line equation, Yc = a+bX since Σx = 0, Yc = 907.18+134.02*10, Yc = 907.18+1340.2,

Yc = 2247.38

9. COLLABORATIVE PUBLICATIONS: TIME SERIES ANALYSIS

Straight Line equation Yc = a+bX since Σx = 0, a=ΣY/N, ΣY = (Total Number of Paper by Multi Author), N = (Number of Years), a = 10574/11, a = 961.27, b=ΣXY/Σ, ΣXY = (Total of XY Tables), Σ = (Total of X2 Table), b = 15466/110, b = 140.6.

Estimated literature in 2020 is, When X = 2020-2010(Mid-Year) X = 10,

Apply Straight line equation, Yc = a+bX since Σx = 0, Yc = 961.27+140.6*10, Yc = 961.27+1406,

Yc = 2367.27

On the utilization of the formula of Time Series Analysis for the expectation of oncology research output in India for the year 2020, it was found that the future trend and development in oncology research literature output may take an expanding trend in single authored publications (Yc = 93.51)during the years to come and collaborative publications trends also increasing gradually (Yc = 2367.27).

10. CONCLUSION

In this study directs an authorship patterns towards collaborative research is seen reliable during 2005-2015 in the field of oncologyresearch output in India.The study exposes the following conclusions.

- ✓ The increased trend towards multiple authorship is predominant as compare to single authorship in case of oncology in India.In the study, the degree of collaboration was not a constant value, it reveals varies of 0.03 to 0.16 percent and the mean quality as 0.09.
- ✓ The analysis found that single author papers maintained a low profile among oncology research scientists and the multi authorship pattern is expanding slowly in Indian oncology research.

Time Series Analysis for the expectation of oncology research output in India for the year 2020, it was found that the future trend and development in oncology research literature output may take a positive growth trend.

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