Leukemia Research Literature in India: A Scientometric Analysis

M. Lakshmi
Research Scholar,
Dept. of Library and Information Science
Alagappa University, Karaikudi, Tamilnadu,

S. Raja
Asst. Librarian,
AUCB Public Library, Alagappa University,
Karaikudi, Tamilnadu, India
lisraja1979@gmail.com

Abstract

The study has deal with leukemia research literature in India. The paper has been confer about Pearson's correlation and Linear regression, relative growth rate and doubling time, authorship pattern, word wise and Journal-wise contribution and other scientometric parameters. The leukemia research output for the period from 2005 to 2014 totally 2410 record published, total citation 15172, citing articles without self-citation 14591, average citation per items 7.22, h-index 52

Keywords

Scientometric; leukemia; India; acute; myeloid; lymphoblastic

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INTRODUCTION

Scientometrics is the study of measuring and analyzing science, technology and innovation. Major research issues include the measurement of impact, reference sets of articles to investigate the impact of journals and institutes, understanding of scientific citations, mapping scientific fields and the production of indicators for use in policy and management contexts. In practice there is a significant overlap between scientometrics and other scientific fields such as Bibliometrics, information science and science of science policy. The present study aims that the research productivity of researchers, scientists and faculty from various countries on publications relating to leukemia in web of science bibliographic database for the period of 2005 to 2014. RayChoudhury, N., & Sarkhel, J. K. (2011) mapped agricultural research in West Bengal, as seen from CAB Abstracts for a 15-year period from 1993-2007. The study found out that Researchers from 303 institutions located in 45 cities/towns have authored 10417 papers in 1178 journals published from 53 countries and other literary forms. Further the result shows that there has been a topsy-turvy growth in the research publication during the period. De Souza Vanz, S. A., &Stumpf, I. R. C. (2012)carried out an investigation of Brazilian articles indexed by SCI between 2004 and 2006 with the purpose of understanding the scientific collaboration in the Brazilian community. Kademani, B. S., Sagar, A., Surwase, G., &Bhanumurthy, K. (2013) analyzed global publication trends in materials science. The study attempts to highlight quantitatively and qualitatively growth and development of world literature on materials science in terms of publication output and citations as per Web of Science (2006–2010). Krishnan, V & Raja, S. (2014) The study analyzes current science research publication of 2357 records were downloaded and analyzed by using the histcite software application from 2000 to 2013. The data is analyzed to know the authorship pattern, degree of collaboration and geographical distribution of papers.

OBJECTIVES

1. To determine the rate of growth of leukemia literature by calculating relative growth rates and doubling time for publications.
2. To study the applicability of Pearson's correlation and linear regression for the original publications data studying actual growth pattern.

METHODOLOGY

This study is based on the publication data in 'leukemia' retrieved from the Web of Science (WoS) database has articles downloaded from the year 2005 to 2014. The articles were transferred to spread sheet application and analyzed the data as per objectives of the study.

STATISTICAL METHOD

To investigate the nature of growth of articles, Pearson's correlation and linear regression were tested. The Pearson's correlation is define as

Pearson's r is designed so that the correlation between article and Total Global Citation Score is the same whether highest is measured in no of record. To achieve this property, Pearson's correlation is computed by dividing the sum of the xy column (Σxy) by the square root of the product of the sum of the x^2 column (Σx^2) and the sum of the y^2 column (Σy^2). The resulting formula is: $r = \frac{\sum xy}{\sqrt{\sum x^2 \sum y^2}}$

An alternative computational formula that avoids the step of computing deviation scores is:

$$r = \frac{\sum XY - \frac{\sum X \sum Y}{N}}{\sqrt{\left(\sum X^2 - \frac{(\sum X)^2}{N}\right)}\sqrt{\left(\sum Y^2 - \frac{(\sum Y)^2}{N}\right)}}$$

In simple linear regression, we predict scores on one variable from the scores on a second variable. The variable we are predicting is called the criterion variable and is referred to as Y. The variable we are basing our predictions on is called the predictor variable and is referred to as X. When there is only one predictor variable, the prediction method is called simple regression. In simple linear regression, the topic of this section, the predictions of Y when plotted as a function of X form a straight line

The regression equation is a linear equation of the form: $\hat{y} = b0 + b1x$.

RELATIVE GROWTH RATE (RGR) AND DOUBLING TIME (Dt)

Relative Growth Rate (RGR) and Doubling Time (Dt) had been applied. RGR means the increase in the number of articles per unit of time. The mean RGR of articles over the specific period of interval is represented as

$$Rt(P) = \frac{1}{t}\left[\log_e p(t) - \log_e p(0)\right]$$

Rt = Relative Growth Rate of articles over the specific period of time.

$\log_e p(0)$ = Logarithm of initial number of articles

$\log_e p(t)$ = Logarithm of final number of articles

Dt (Doubling Time) has been calculated using the following formula:

Doubling Time Dt = 0.693/R

$$Dt\ (SA) = \frac{\log_e 2}{R_t(SA)} = \frac{0.693}{R_t(SA)}$$

Here, Dt (SA) = average doubling time of subject articles. **(Keshava, 2004).**

ANALYSIS AND RESULTS

Relative Growth Rate and Doubling Time

The relative growth rate and doubling time of publications have been presented in Table 1 and figure 1. Indicate the value of an average RGR of publications which decreased from 4.55 in 2005 to 0.20 in 2014. Simultaneously, the values of doubling time (Dt) of publications increased from 6.57 in 2005 to 0.29 in 2014. The research publication 2013 RGR and Dt values decreased 0.19 and 0.28.

Table 1: Shows the RCR and Dt. of Leukemia output

S.No	Publication Year	Record	Cumulative	Percentage (%)	W1	W2	RGR	Dt
1	2005	95	95	3.96	0	4.55	4.55	6.57
2	2006	107	202	4.46	4.55	5.31	0.75	1.09
3	2007	149	351	6.21	5.31	5.86	0.55	0.80
4	2008	179	530	7.46	5.86	6.27	0.41	0.59
5	2009	226	756	9.41	6.27	6.63	0.36	0.51
6	2010	270	1026	11.25	6.63	6.93	0.31	0.44

7	2011	291	1317	12.12	6.93	7.18	0.25	0.36
8	2012	306	1623	12.74	7.18	7.39	0.21	0.30
9	2013	346	1969	14.41	7.39	7.59	0.19	0.28
10	2014	432	2401	17.99	7.59	7.78	0.20	0.29

Table 2: Shows the RCR and Dt. of Leukemia TGCS

S.No	Publication Year	TGCS	Cumulative	Percentage (%)	W1	W2	RGR	Dt
1	2005	1376	1376	8.43	0.00	7.23	7.23	10.43
2	2006	1383	2759	8.47	7.23	7.92	0.70	1.00
3	2007	1946	4705	11.92	7.92	8.46	0.53	0.77
4	2008	1537	6242	9.41	8.46	8.74	0.28	0.41
5	2009	1786	8028	10.94	8.74	8.99	0.25	0.36
6	2010	3447	11475	21.11	8.99	9.35	0.36	0.52
7	2011	2007	13482	12.29	9.35	9.51	0.16	0.23
8	2012	1619	15101	9.91	9.51	9.62	0.11	0.16
9	2013	917	16018	5.62	9.62	9.68	0.06	0.09
10	2014	312	16330	1.91	9.68	9.70	0.02	0.03

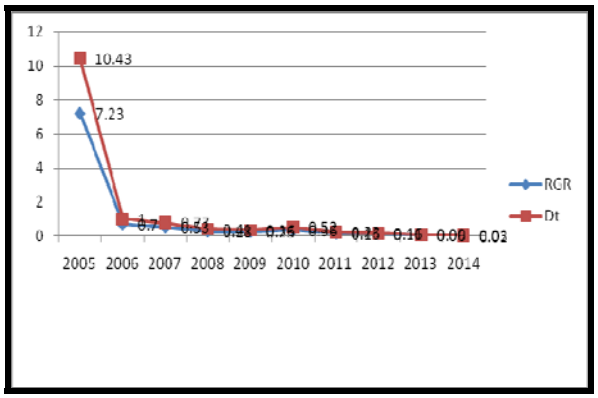


Figure -1 – Shows the RCR and Dt. of Leukemia TGCS

The relative growth rate and doubling time of publications have been presented in Table 2 and figure 2. Indicate the value of an average RGR of publications which decreased from 7.23 in 2005 to 0.02 in 2014. Simultaneously, the values of doubling time (Dt) of publications increased from 10.43 in 2005 to 0.03 in 2014. It shows that the mean relative growth of leukemia literature has shown an increasing trend. It may be due to interdisciplinary and multidisciplinary nature of research and the communication pattern of medical researcher

Pearson's correlation and Linear Regression

Let's say you were analyzing the relationship between article and Total global citation score. You're curious as to if there is a positive or negative relationship between someone's article and global citation. After conducting the test, your Pearson correlation coefficient value is +95. Therefore, you would have a slightly positive correlation between the two variables, so the strength of the relationship is also positive and considered strong. You could confidently conclude there is a strong relationship and positive correlation between article and citation. In other words, as publication grows highest, their citation tends to increase as well. In the article, the regression lines are typically manually and find the LR value -581088.48. The calculations are based on the statistics shown in Table 3.

Table 3: Shows the Pearson's Correlation and Linear Regression

S.No	Publication Year	Record (x)	TGCS (y)	(x)(y)	(*x*^2)	(*y*^2)	$r = \frac{\Sigma x_i y_i - \frac{\Sigma x_i \Sigma y_i}{10}}{\sqrt{(\Sigma x_i^2 - \frac{(\Sigma x_i)^2}{10})(\Sigma y_i^2 - \frac{(\Sigma y_i)^2}{10})}}$ Pearson's Correlation	Linear Regression ($\hat{Y} = \beta 1x+\beta 0$)
1	2005	95	1376	130720	9025	1893376	36.84	-581088.48
2	2006	107	1383	147981	11449	1912689		
3	2007	149	1946	289954	22201	3786916		
4	2008	179	1537	275123	32041	2362369		

5	2009	226	1786	403636	51076	3189796		
6	2010	270	3447	930690	72900	11881809		
7	2011	291	2007	584037	84681	4028049		
8	2012	306	1619	495414	93636	2621161		
9	2013	346	917	317282	119716	840889		
10	2014	432	312	134784	186624	97344		

Journal wise publication

The most productive journal is pediatric blood & cancer with 161 papers dealing with leukemia and TGCS 157 of all papers published in this research field. The journal of the seminal publication on leukemia given table 4, Indian journal of hematology and blood transfusion , appear on rank 2 94, TGCS 33 and rank 3,64, TGCS 616 blood respectively.

Table 4 : Shows the Journal wise Publication

S.No	Journal	Record	TGCS
1	PEDIATRIC BLOOD & CANCER	161	157
2	INDIAN JOURNAL OF HEMATOLOGY AND BLOOD TRANSFUSION	94	33
3	BLOOD	64	616
4	INDIAN JOURNAL OF PATHOLOGY AND MICROBIOLOGY	61	81
5	LEUKEMIA & LYMPHOMA	57	234
6	JOURNAL OF CLINICAL ONCOLOGY	51	427
7	INDIAN JOURNAL OF PEDIATRICS	50	91
8	ASIAN PACIFIC JOURNAL OF CANCER PREVENTION	44	178
9	JOURNAL OF PEDIATRIC HEMATOLOGY ONCOLOGY	43	148
10	EUROPEAN JOURNAL OF MEDICINAL CHEMISTRY	37	477
11	PLOS ONE	37	213
12	INDIAN JOURNAL OF CANCER	35	35
13	INDIAN PEDIATRICS	35	62
14	PEDIATRIC HEMATOLOGY AND ONCOLOGY	33	87
15	ANNALS OF ONCOLOGY	30	5
16	BIOORGANIC & MEDICINAL CHEMISTRY LETTERS	23	274
17	HEMATOLOGY	23	90
18	JOURNAL OF CANCER RESEARCH AND THERAPEUTICS	22	25
19	LEUKEMIA RESEARCH	20	142
20	ANNALS OF HEMATOLOGY	19	80

Author wise publication

The most productive Author is pediatric Bakhshi Sameer with 64 papers dealing with leukemia and TGCS 201 of all papers published in this research field. The author of the seminal publication on leukemia given table 5, George Biju and Mathews Vikram, appear on rank 2 & 3, 43 and 39 record, 501 and 218 TGCS.

Table 5: Shows the Author wise Publication

S.No	Author	Record	TGCS
1	Bakhshi Sameer	64	201
2	George Biju	43	501
3	Mathews Vikram	39	218
4	Srivastava Alok	37	235
5	Saxena Renu	36	81
6	Varma Neelam	35	137
7	Bansal Deepak	33	93
8	Kumar Lalit	32	141
9	Marwaha R. K.	32	87
10	Bhushan Shashi	30	371
11	Sachdeva Anupam	30	37
12	Chandy Mammen	29	227
13	Mandal Chitra	29	310
14	Raghavan Sathees C.	29	352
15	Trehan Amita	29	74
16	Gupta Ritu	28	34
17	Marwaha Ram Kumar	27	85
18	Yadav Satya Prakash	27	36
19	Raina Vinod	26	46
20	Sharma Atul	26	45

Word wise publication

The high frequency keywords will enable us to understand the various aspects leukemia under study. Table 6 the high frequency keywords were: leukemia 980 (TGCS 4481), acute 645 (TGCS 2063), myeloid 371(TGCS 2230), lymphoblastic 329 (TGCS 925) and chronic 300 (TGCS 1882). Analysis of the keywords appeared either on the title or assigned by

the indexer or the author himself will help in knowing in which direction the knowledge grows.

Table 6: Shows the Word wise publication

S.No	Word	Record	TGCS
1	leukemia	980	4481
2	acute	645	2063
3	myeloid	371	2230
4	lymphoblastic	329	925
5	chronic	300	1882
6	cell	276	1886
7	cancer	243	3541
8	cells	235	3108
9	patients	220	782
10	india	183	485
11	synthesis	153	1362
12	activity	143	1187
13	imatinib	132	1202
14	apoptosis	128	1944
15	human	126	1641
16	childhood	122	591
17	novel	119	872
18	therapy	119	758
19	children	113	296
20	leukaemia	110	400

CONCLUSION

This paper has analyzed 2410 distributions on leukemia and cited to in the web of science database amid 2005-2014. It expresses that show the estimation of the leukemia research production 2013, RGR and Dt qualities diminished 0.19 and 0.28. It demonstrates that the leukemia pearson's correlation esteem 36.84 and linear regression esteem -581088.48. The most profitable journal is pediatric blood & malignancy with 161 papers managing leukemia and TGCS 157 of all papers distributed in this exploration field. The prevalent creator is pediatric Bakhshi Sameer with 64 papers managing leukemia and TGCS 201. The high recurrence magic words leukemia 980 (TGCS 4481) and intense 645 (TGCS 2063).The examination investigation will supportive to Society, academician, analyst and Subject proficient.

REFERENCES

1. RayChoudhury, N., &Sarkhel, J. K. (2011). Mapping Agricultural Research in West Bengal-1993–2007: A Bibliometric study.*COLLNET Journal of Scientometrics and Information Management*, *5*(1), 99-113.

2. De Souza Vanz, S. A., &Stumpf, I. R. C. (2012). Scientific output indicators and scientific collaboration network mapping in Brazil. *COLLNET Journal of Scientometrics and Information Management*, *6*(2), 315-334

3. Kademani, B. S., Sagar, A., Surwase, G., &Bhanumurthy, K. (2013). Publication trends in materials science: a global perspective. *Scientometrics*, *94*(3), 1275-1295.

4. Krishnan, V & Raja S (2014). Citation Analysis on Current Science Publications: A Global Perspective. International journal of Current Research and Academic Review, 2(1), 76- 87

5. Keshava (2004). Scientometric analysis of social science research in India. Dept. of Library and Information Science, Karnataka University, Dharwad, Ph.D. Thesis, 125-126.

6. S. Raja, P. Ramkumar and P. Viji (2011). Scientometric dimension on gender in worldwide thyroid cancer: A study based on web of science database. Indian Journal of Science and Technology 4 (4) , 425

7. http://onlinestatbook.com/2/regression/intro.html

8. https://www.easycalculation.com/statistics/learn-regression.php

9. https://en.wikipedia.org/wiki/Scientometrics

10. http://www.guillaumelobet.be/science_valorisation/

11. http://www.encyclo.co.uk/meaning-of-Scientometrics

12. http://www.tandfonline.com/doi/abs/10.1080/09737766.2011.10700905

13. http://hlwiki.slais.ubc.ca/index.php/Scientometrics