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Authorship pattern and collaborative research in the field of Ebola (1995 – 2014): A Bibliometric Analysis

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ABSTRACT

This paper presents a bibliometric analysis of the authorship pattern in the field of Ebola covered in the bibliographic database namely MEDLINE which covered in Pubmed for the period 1995-2014. MEDLINE covered the maximum of 2519 records during the study period i.e. 1995 to 2014. More than 52.75% of the total contributions represent collaborative research. The degree of collaboration has been arrived at 0.55. The value of Co-Authorship Index (CAI) for single author paper shows that the single author papers during first three blocks i.e. 1995-1999, 2000-2004 and 2005-2009 were below 100 which started increasing in the fourth block and the CAI was 128.73. This reveals that the single author papers were dominating in the recent years. Similarly, for two authored papers, during 2000-2004 and 2005-2009, the CAI was 135.33 and 133.79, and declined in other two blocks. The CAI for multi authored papers results shows that first three blocks i.e. 1995-1999, 2000-2004 and 2005-2009 were above 100 and in the fourth block it was below 100. This shows that multiple authored papers lower in recent years.

Keywords: Ebola, Authorship pattern, Collaborative research, Degree of Collaboration (DC), Co-Authorship Index (CAI).

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1.INTRODUCTION:

The study of authorship pattern or productivity is one of the essential aspects in the bibliometric analysis. This study was aimed to observe the authorship pattern and collaborative research in the field of 'Ebola' with the help of bibliographic database namely MEDLINE which covered in Pubmed. Generally it is necessary to concentrate on authorship pattern to evaluate the research contributions in a field and Ebola research is not an exception.

2.LITERATURE REVIEW:

Several studies on authorship pattern or productivity in the bibliometric analysis¹⁻
¹⁰Rajendran, Ramesh Babu and Gopalakrishnan (2005)¹¹ analysed the global output of “fiber optics” research with regard to Growth of literature by year wise, country wise, authorship pattern, bibliographic forms, ranking of core journals and nature of research have been analysed. Ramesh Babu, B and Ramakrishnan, J (2010)¹² studied on Authorship pattern and Collaborative research in the field of Hepatitis. ChandaArya (2012)¹³ studies the authorship pattern and collaborative research trends in the field of veterinary medicine based on the data collected from 'Indian Journal of Veterinary Medicine' published during the period 1999 - 2007. Elango and Rajendran (2012)¹⁴ examined the authorship trend and collaboration pattern in Marine Sciences literature. Scientometric tools such as, collaboration index, collaboration co-efficient and dominance factor have been used. Velmurugan (2013)¹⁵ investigated the bibliometric analysis of 203 articles appearing in Annals of Library and Information Studies journal selected six years for a period between 2007 and 2012. Thavamani(2014)¹⁶ analyzed the authorship trend in the “Chinese Librarianship: an International Electronic Journal (CLIEJ)” during the period of 1996-2013. Navaneethakrishnan (2014)¹⁷ study was to identify the authorship patterns and degree of collaboration of Sri Lanka in humanities and social science research.

3.EBOLA

Ebola virus disease (EVD; also Ebola hemorrhagic fever, or EHF), or simply Ebola, is a disease of human and other primates caused by Ebola viruses. Signs and symptoms typically start between two days and three weeks after contracting the virus with a fever, sore throat, muscle pain, and headaches. Then vomiting, diarrhea and rash usually follow, along with decreased function of the liver and kidneys. At this time some people begin to bleed both internally and externally. The disease has a high risk of death, killing between 25 percent and 90 percent of those infected with an average of about 50 percent. This is often due to low blood pressure from fluid loss, and typically follows six to sixteen days after symptoms appear. (http://en.wikipedia.org/wiki/Ebola_virus_disease)¹⁸

4.OBJECTIVES

1. To analyse the extent of authorship pattern. i.e. Single Vs. Multiple authors in the field of Ebola covered in MEDLINE during the period 1995-2014.
2. To examine the degree of collaboration in Ebola literature output.
3. To analyse the Co-Authorship Index (CAI) in the field of literature on Ebola.

5. METHODOLOGY

The records published during the year 1995 to 2014 in the field of Ebola in the MEDLINE data which are covered in the Pubmed (www.pubmed.com) which is a free resource that is developed and maintained by the National Center for Biotechnology Information (NCBI), at the U.S. National Library of Medicine (NLM), located at the National Institutes of Health (NIH) was searched and bibliographic details like author, title, publication type, language, year; address of the contributors, country of publications, source etc. were collected.

The retrieved records were converted into FoxPro and loaded in SPSS for the purpose of analysis. The keyword 'Ebola' has been used for extracting the number of records available in the above said database. The data thus collected from the source database on the literary production of 'Ebola' for the period 1995-2014 has been analysed by using bibliometric indicators such as Degree of Collaboration (DC) and Co-Authorship Index (CAI).

6. LIMITATIONS

This study is confined to a period of twenty years from 1995 to 2014 in the field of Ebola in the MEDLINE data which are covered in the Pubmedonly.

7. ANALYSIS AND INTERPRETATION OF DATA

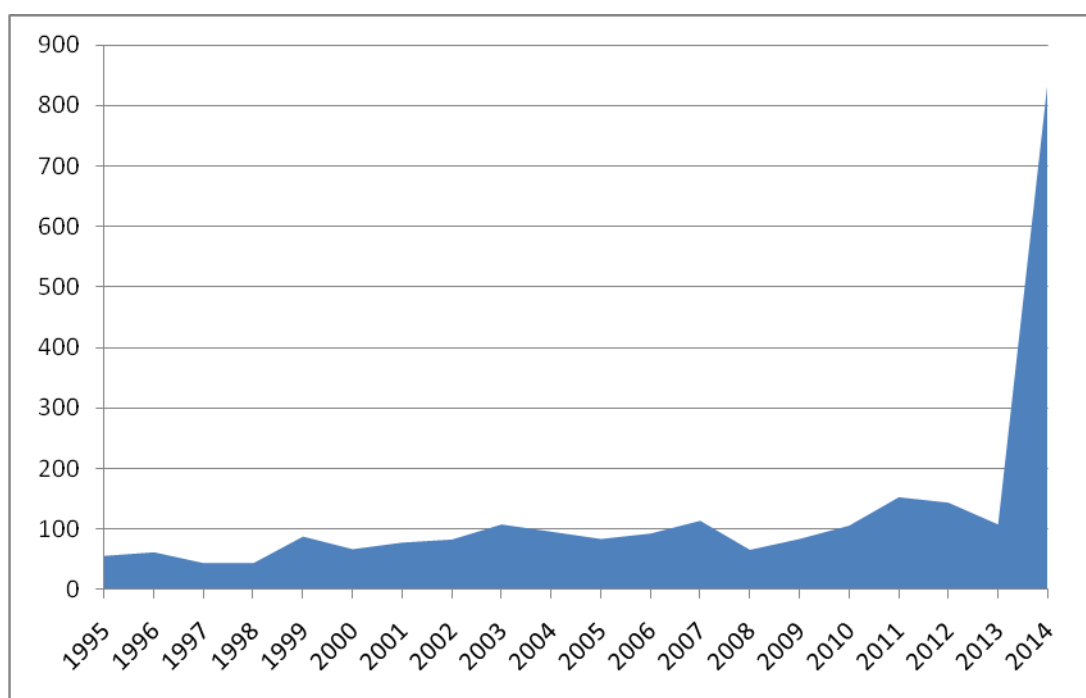
Data collected from the source database namely MEDLINE on the literary production of 'Ebola' for the period 1995-2014 has been analysed by using bibliometric techniques as described.

7.1 QUANTUM OF EBOLA RESEARCH PRODUCTIVITY

The research productivity on 'Ebola' covered in the database is shown in Table 1. Total of 2519 records are covered in the database MEDLINE on 'Ebola' at the time of retrieved the data. It is found that the maximum number of records (841) was published during 2014, followed by 153 in 2011 and 144 in 2012. On the whole, it is noticed that from 1995 onwards there is a gradual increase of Ebola research productivity every year except few years where the records low compare to previous years. Of course, the records in 2014 is very high compare to other years in the study period which shows that recent year the research in Ebola is very active and also the disease is taken very serious in the recent years throughout the world.

Table 1: Quantum of Literature published in 'Ebola' Year wise

Years	Records on Ebola	Percentage	Cumulative Records	Cumulative Percentage
1995	56	2.22	56	2.22
1996	62	2.46	118	4.68
1997	44	1.75	162	6.43
1998	44	1.75	206	8.18
1999	88	3.49	294	11.67
2000	67	2.66	361	14.33
2001	78	3.10	439	17.43
2002	83	3.29	522	20.72
2003	108	4.29	630	25.01
2004	96	3.81	726	28.82
2005	84	3.33	810	32.16
2006	93	3.69	903	35.85
2007	114	4.53	1017	40.37
2008	66	2.62	1083	42.99
2009	84	3.33	1167	46.33
2010	106	4.21	1273	50.54
2011	153	6.07	1426	56.61
2012	144	5.72	1570	62.33
2013	108	4.29	1678	66.61
2014	841	33.39	2519	100.00
Total	2519	100.00		

**Figure 1 Quantum of Literature published in 'Ebola' Year wise**

7.2AUTHORSHIP PATTERN

To identify author productivity and authorship pattern, the paper has attempted to analyse the following aspects:

1. Extent of authorship pattern. i.e. Single Vs. Multiple authors.
2. Degree of Collaboration (DC).
3. Pattern of Co-Authorship Index (CAI).

7.2.1 Single Vs Multiple Authors

The year wise distribution of contributions according to number of authors is shown in Table 2. It is evident from the Table 2 that 42.87% of the contributions were by single author and 23.90% of the contributions were by more than five authors. 52.75% represent two and more authors, which mean collaborative research is evident in the Ebola field (Figure-2).

Table 2
Authorship pattern in Ebola from 1995 to 2014

Authors	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	No. of records	%
Single	18	34	20	18	20	28	30	30	31	37	22	24	22	13	21	13	25	25	23	626	1080	42.87
Two	3	6	2	2	9	9	10	12	13	8	9	10	17	5	12	14	23	15	5	47	231	9.17
Three	3	3	3	9	6	5	14	15	9	10	10	9	13	9	5	12	17	14	8	14	188	7.46
Four	4	5	5	6	12	8	7	11	8	10	5	4	10	2	4	14	11	6	6	17	155	6.15
Five	2	3	3	5	7	7	5	3	15	7	6	5	9	9	6	12	11	15	12	11	153	6.07
> Five	7	7	9	4	33	8	6	12	28	23	29	41	40	27	34	41	65	64	52	72	602	23.90
Anon	19	4	2		1	2	6		4	1	3		3	1	2		1	5	2	54	110	4.37
Total	56	62	44	44	88	67	78	83	108	96	84	93	114	66	84	106	153	144	108	841	2519	100.00

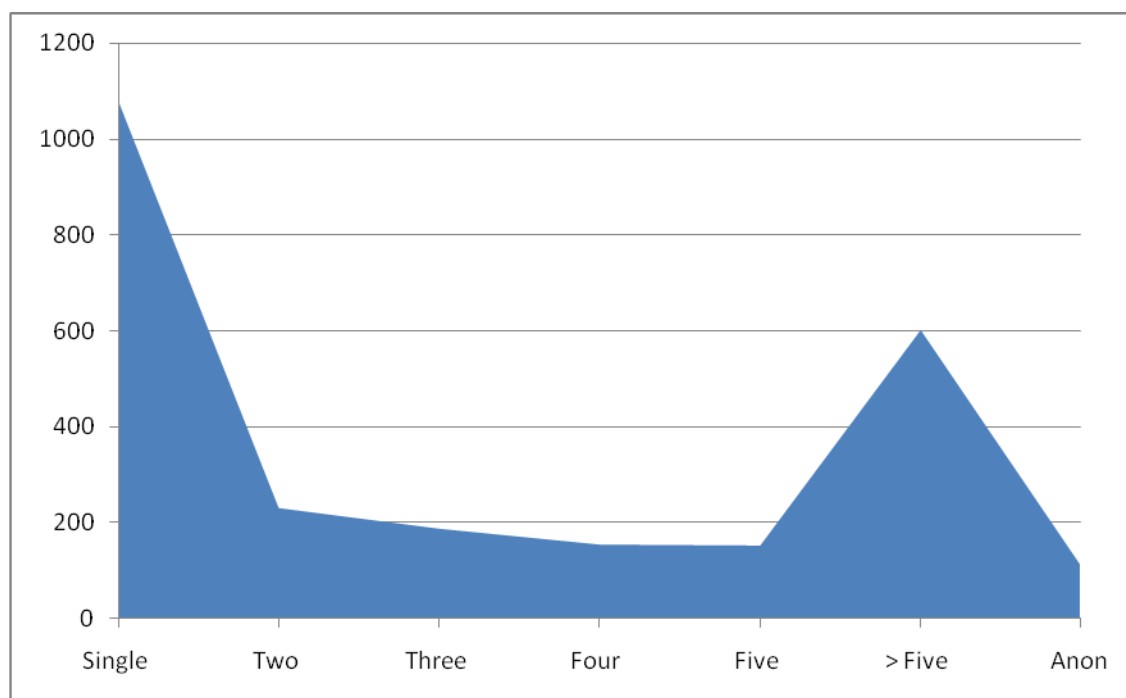


Figure 2 Authorship pattern in Ebola from 1995 to 2014

Data in Table 3 reveals the state of authorship pattern. As already mentioned multiple authors' papers constitute the major percentage. However, it was noticed that a meager percent (4.37%) represent anonymous authorship. The high incident by multiple authorship is the phenomena of scientific research. (Figures 3 and 4).

Similar studies in Phytomorphology (Maheswarappa&Nagappa, 1981)¹⁹, Applied Sciences(Maheswarappa& Mathias,1987)²⁰, Geology(Maheswarappa&Savadatti, 1990)²¹, Plant Breeding(Chakraborty,1981)²², Zoological Sciences(Begum &Rajendra, 1990)²³, Agricultural Sciences(Munshi, Vashishth&Gautam, 1993)²⁴, Medicinal and Aromatic Plants(Mishra & Mishra, 1991)²⁵, and Environmental Genetic Toxicology(Pulla Reddy, & Sharma 1988)²⁶ also showed that the numbers of single authorship papers are much less when compared to multi-authored papers.

Table 3
Single Vs Multi Authored Papers in Ebola Research

Year	Anonymous		Single Authored		Multi Authored		Total	%
	Papers	%	Papers	%	Papers	%		
1995	19	17.27	18	1.67	19	1.43	56	2.22
1996	4	3.64	34	3.15	24	1.81	62	2.46
1997	2	1.82	20	1.85	22	1.66	44	1.75
1998	-	0.00	18	1.67	26	1.96	44	1.75
1999	1	0.91	20	1.85	67	5.04	88	3.49
2000	2	1.82	28	2.59	37	2.78	67	2.66
2001	6	5.45	30	2.78	42	3.16	78	3.10
2002	-	0.00	30	2.78	53	3.99	83	3.29
2003	4	3.64	31	2.87	73	5.49	108	4.29
2004	1	0.91	37	3.43	58	4.36	96	3.81
2005	3	2.73	22	2.04	59	4.44	84	3.33
2006	-	0.00	24	2.22	69	5.19	93	3.69
2007	3	2.73	22	2.04	89	6.70	114	4.53
2008	1	0.91	13	1.20	52	3.91	66	2.62
2009	2	1.82	21	1.94	61	4.59	84	3.33
2010	-	0.00	13	1.20	93	7.00	106	4.21
2011	1	0.91	25	2.31	127	9.56	153	6.07
2012	5	4.55	25	2.31	114	8.58	144	5.72
2013	2	1.82	23	2.13	83	6.25	108	4.29
2014	54	49.09	626	57.96	161	12.11	841	33.39
Total	110	100.00	1080	100.00	1329	100.00	2519	100.00

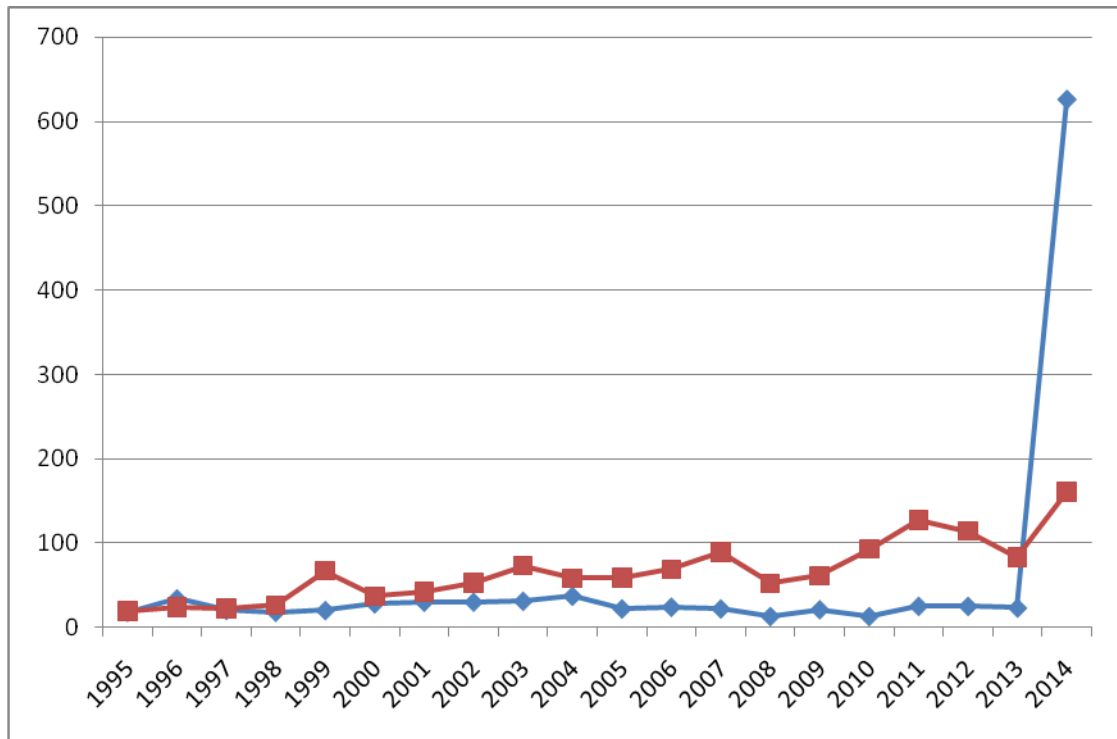


Figure 3 Single Vs. Multi authored Papers in Ebola research

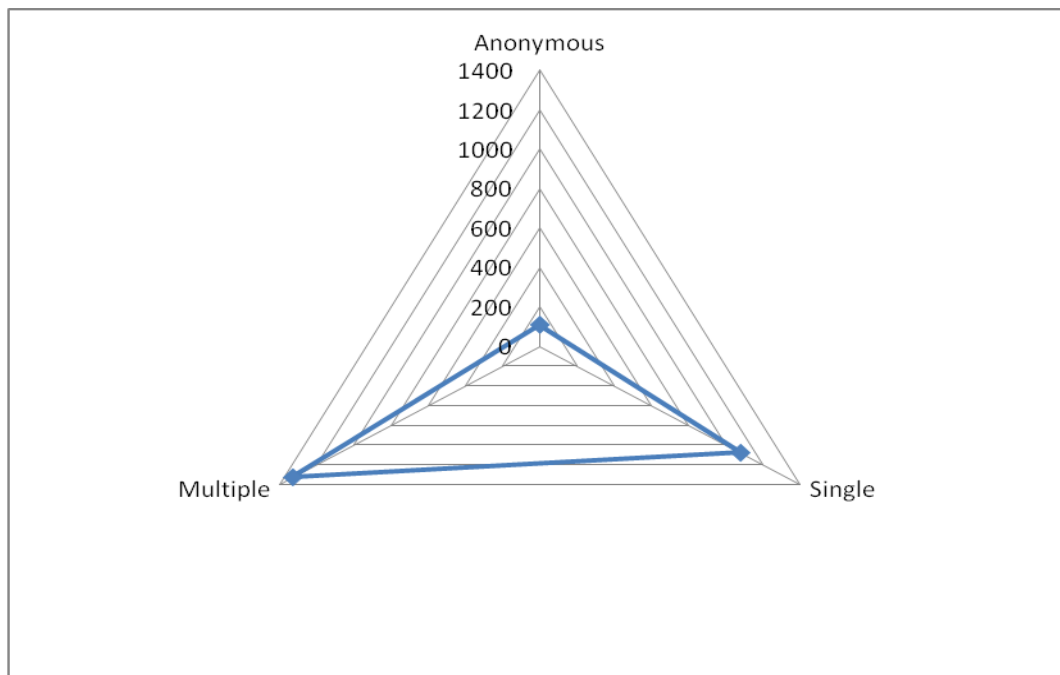


Figure4 Authorship Pattern in Ebola

7.2.2 Degree of Collaboration

The Degree of Collaboration of authors by year wise is shown in Table 4. The extent of Degree of Collaboration in Ebola research has been measured with the help of the formula devised by K. Subramanyam, (1993)²⁷.

“The formula is

$$C = \frac{N_m}{N_m + N_s}$$

where

C = Degree of Collaboration in a discipline

N_m = Number of multiple authored papers

N_s = Number of single authored papers”

Accordingly, the Degree of Collaboration has been calculated for the year 1995 is as follows:

$$C = \frac{19}{19 + 18} = \frac{19}{37} = 0.51$$

Likewise the Degree of Collaboration is calculated for every year and presented in the Table 4.

The year wise Degree of Collaboration falls between 0.20 to 0.88. The Degree of Collaboration for any subject ranges from 0.01 to 0.99 and it is always below 1 which has been proved by Karisiddappa, Maheswarappa and Shirol(1990)²⁸ in Psychology and

Bandyopadhyay(2001)²⁹ in different disciplines such as Mathematics, Physics, Philosophy, Political Science and Mechanical Engineering.

Table 4: Degree of Collaboration in Ebola Research

Year	Anonymous	Single author	Two authors	Three Authors	Four Authors	Five Authors	More than Five author	Total	More than one author	Degree of Collaboration
1995	19	18	3	3	4	2	7	56	19	0.51
1996	4	34	6	3	5	3	7	62	24	0.41
1997	2	20	2	3	5	3	9	44	22	0.52
1998	-	18	2	9	6	5	4	44	26	0.59
1999	1	20	9	6	12	7	33	88	67	0.77
2000	2	28	9	5	8	7	8	67	37	0.57
2001	6	30	10	14	7	5	6	78	42	0.58
2002	-	30	12	15	11	3	12	83	53	0.64
2003	4	31	13	9	8	15	28	108	73	0.70
2004	1	37	8	10	10	7	23	96	58	0.61
2005	3	22	9	10	5	6	29	84	59	0.73
2006	-	24	10	9	4	5	41	93	69	0.74
2007	3	22	17	13	10	9	40	114	89	0.80
2008	1	13	5	9	2	9	27	66	52	0.80
2009	2	21	12	5	4	6	34	84	61	0.74
2010	-	13	14	12	14	12	41	106	93	0.88
2011	1	25	23	17	11	11	65	153	127	0.84
2012	5	25	15	14	6	15	64	144	114	0.82
2013	2	23	5	8	6	12	52	108	83	0.78
2014	54	626	47	14	17	11	72	841	161	0.20
Total	110	1080	231	188	155	153	602	2519	1329	0.55

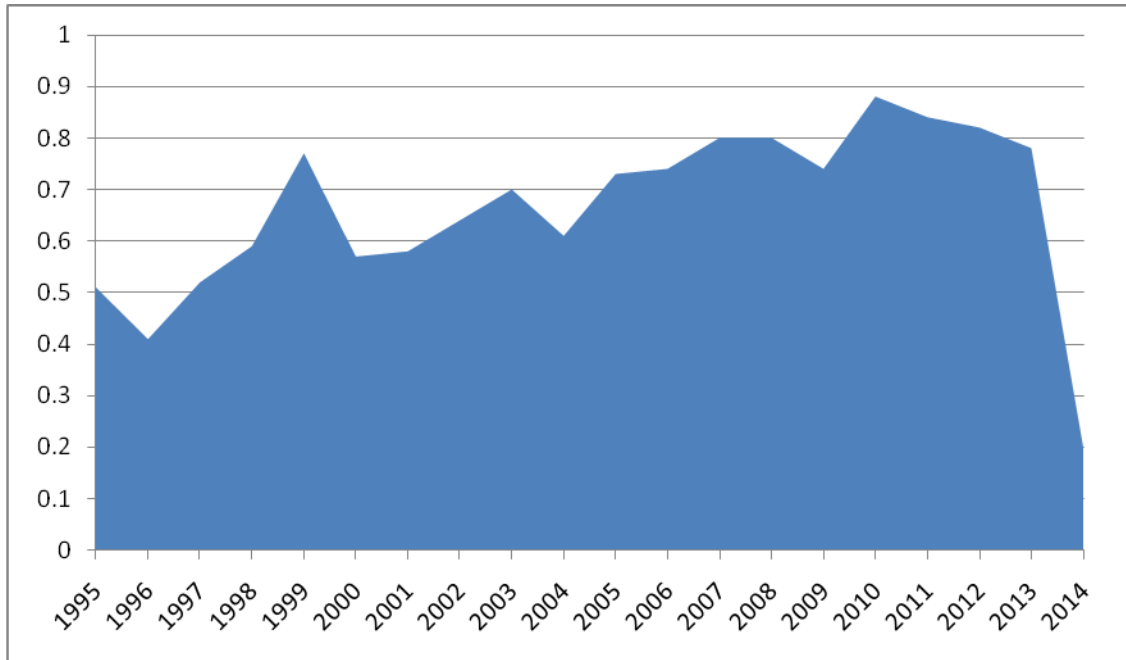


Figure 5 Year-wise Degree of Collaboration in Ebola Research

7.2.3 Pattern of Co-Authorship Index (CAI)

In order to find out how the patterns of co-authors have changed during 1995 to 2014, the formula of Co-Authorship Index (CAI) suggested by Garg and Padhi(2001)³⁰ has been used.

“For calculating CAI the entire data set was divided into four blocks.

$$CAI = \{(N_{ij} / N_{io}) / (N_{oj} / N_{oo})\} * 100$$

N_{ij} : number of papers having j authors in block I ;

N_{io} : Total output of block I ;

N_{oj} : number of papers having j authors for all blocks;

N_{oo} : total number of papers for all authors and all blocks;

$j = 1, 2, 3, \geq 4$ ”

CAI = 100 implies that co-authorship in a particular block for a particular types of authorship corresponds to the world average, CAI > 100 reflects higher than average co-authorship effort and CAI < 100 lower than average co-authorship effort in a particular block for a particular type of authorship.

For calculation of CAI the entire data were divided into four blocks as per the procedure laid down in the formula and the results of CAI given in Table 5. It is observed from the Table 5 that the value of CAI for single author papers during first three blocks i.e. 1995-1999, 2000-2004 and 2005-2009 were below 100 which started increasing in the fourth block and the CAI was 128.73. This reveals that the single author papers were dominating in the recent years. Similarly, for two authored papers, during 2000-2004 and 2005-2009, the CAI was 135.33 and 133.79, and declined in other two blocks. The CAI for multi authored papers results shows that first three blocks i.e. 1995-1999, 2000-2004 and 2005-2009 were above 100 and in the fourth block it was below 100. This shows that multi authored papers lower in recent years.

Table 5 Pattern of Co-Authorship Index (CAI) by Year Wise

Sl.No.	Year	Single Author	Two authored	More than Two authors	Total
1	1995-1999	110 (95.73)	22 (89.52)	136 (116.42)	268
2	2000-2004	156 (86.84)	52 (135.33)	211 (115.53)	419
3	2005-2009	102 (55.07)	53 (133.79)	277 (147.10)	432
4	2010-2014	712 (128.73)	104 (87.91)	474 (84.30)	1290
Anonymous					110
Total		1080	231	1098	2519

8. Conclusion:

More than 52.75% of the total contributions represent the collaborative research. The degree of collaboration has been arrived at 0.55 during the study period. The value of Co-Authorship Index (CAI) for single author paper shows an increasing trend in the recent years. On the other hand for multi authored papers the Co-Authorship Index reveals a decreasing trend in the recent years.

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