

Authorship Pattern and Collaborative Research in the Field of Chronic Liver Diseases (1984-2013)

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Abstract – This paper presents a bibliometric analysis of the authorship pattern in the field of Chronic Liver Diseases covered in the bibliographic database namely MEDLINE which covered in Pubmed for the period 1984-2013. MEDLINE covered the maximum of 77177 records during the study period 1984 to 2013. More than 90% of the total contributions represent collaborative research. The degree of collaboration has been arrived at 0.91. The value of Co-Authorship Index (CAI) for single author paper shows a declining trend from one block year period to another block. Similarly, for two authored papers, during 1984-1989, the CAI was 112.39, and started declining in other blocks. The CAI for multi authored papers was lowest (94.06) in the first block and enhanced to 103.72 in the fifth block period from 2008 to 2013. It indicates that the team work in Chronic Liver Diseases research is in increasing trend.

Keywords: ICT, special library, Bangladesh, information, service, provide, technology, automation, communication.

I. INTRODUCTION

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

II. LITERATURE REVIEW

Several studies on authorship pattern or productivity in the bibliometric analysis¹⁻⁶. The Indian output on Air Pollution research covered in E-CD was analysed quantitatively by Parameswaran, Ramesh Babu and Gopalakrishnan (2003)⁷. The various bibliometric indicators have been used in the analysis, with regard to the authorship pattern, Relative Growth Rate, Doubling time, and Ranking of core journals, and core research institutions in India. Mapping global science using international co-authorship and a comparison of 1990 and 2000 using the Science Citation Index (CD-ROM version) for 1990 and 2000 were examined by Wagner and Leydesdorff (2003)⁸. Rajendran, Ramesh Babu and Gopalakrishnan (2005)⁹ 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)¹⁰ studied on Authorship pattern and Collaborative research in the field of Hepatitis

III. CHRONIC LIVER DISEASES

Chronic liver disease in the clinical context is a disease process of the liver that involves a process of progressive destruction and regeneration of the liver parenchyma leading to fibrosis and cirrhosis. Testing for chronic liver disease involves blood tests, x-rays and biopsy of the liver. The treatment of chronic liver disease depends on the cause. While some conditions may be treated with medications,

others may require surgery or a transplant. Some chronic liver diseases cannot be prevented but one can reduce the risk.¹¹

IV. OBJECTIVES

1. To analyse the extent of authorship pattern. i.e. Single Vs. Multiple authors in the field of Chronic Liver Diseases.
2. To examine the degree of collaboration in Chronic Liver Diseases literature output.
3. To analyse the Co-Authorship Index (CAI) in the field of literature on Chronic Liver Diseases.

V. METHODOLOGY

The records published during the year 1984 to 2013 in the field of Chronic Liver Diseases 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 ‘Chronic Liver Diseases’ 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 ‘Chronic Liver Diseases’ for the period 1984-2013 has been analysed by using bibliometric techniques.

The data thus collected from the source database on the literary production of ‘Chronic Liver Diseases’ for the period 1984-2013 has been analysed by using bibliometric indicators such as Degree of Collaboration (DC), Co-Authorship Index (CAI).

VI. LIMITATIONS

This study is confined to a period from 1984 to 2013 using MEDLINE data which covered in Pubmed only.

VII. ANALYSIS AND INTERPRETATION OF DATA

Data collected from the source database namely MEDLINE on the literary production of ‘Chronic Liver Diseases’ for the period 1984-2013 has been analysed by using bibliometric techniques as described.

The research productivity on ‘Chronic Liver Diseases’ covered in the database is shown in Table 1. It is observed that 77177 of the records on ‘Chronic Liver Diseases’ are covered in the MEDLINE database for a period of thirty years from 1984 to 2013. The year-wise distribution of literature on ‘Chronic Liver Diseases’ according to source database MEDLINE is shown in Table 1. It is found that the maximum number of records (5552) was published during 2013, followed by 4802 in 2012 and 4518 in 2011. On the whole, it is noticed that from 1984 onwards there is a gradual increase of Chronic Liver Diseases research productivity every year except few years which clearly shows in the Figure-1.

TABLE 1 QUANTUM OF LITERATURE PUBLISHED IN CHRONIC LIVER DISEASES BY YEAR WISE

S.No.	Year	Frequency	%	Cumulative %
1	1984	1000	1.3	1.3
2	1985	1035	1.3	2.6
3	1986	1109	1.4	4.1
4	1987	1126	1.5	5.5
5	1988	1077	1.4	6.9
6	1989	1361	1.8	8.7
7	1990	1468	1.9	10.6
8	1991	1622	2.1	12.7
9	1992	1574	2	14.7
10	1993	1729	2.2	17
11	1994	1903	2.5	19.4
12	1995	2154	2.8	22.2
13	1996	2018	2.6	24.8
14	1997	2133	2.8	27.6
15	1998	2178	2.8	30.4
16	1999	2373	3.1	33.5
17	2000	2494	3.2	36.7
18	2001	2585	3.3	40.1
19	2002	2838	3.7	43.8
20	2003	2953	3.8	47.6
21	2004	3198	4.1	51.7
22	2005	3456	4.5	56.2
23	2006	3485	4.5	60.7
24	2007	3722	4.8	65.6
25	2008	3707	4.8	70.4
26	2009	3881	5	75.4
27	2010	4126	5.3	80.7
28	2011	4518	5.9	86.6
29	2012	4802	6.2	92.8
30	2013	5552	7.2	100
Total		77177	100	

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).

For the analysis purpose the output has been presented in two groups of periods i.e. 1984-1998 and 1999-2013.

The year wise distribution of contributions according to number of authors is shown in Table 2 and 3. It is evident from the Table 2 that more than one-third (36.87%) of the contributions were by more than five authors. 88.13% represent two and more authors, which mean collaborative research is evident in the Chronic Liver Diseases field (Figure-2). It is also seen from the Table 3 that nearly 50% (48.28%) of the contributions were by more than five authors. 91.09% represent two and more authors, which also reveals that collaborative research is evident in the Chronic Liver Disease field (Figure-3)

TABLE II AUTHORSHIP PATTERN IN CHRONIC LIVER DISEASES FROM 1984 TO 1998

Authors	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	No. of records	%
Single Author	170	124	125	128	134	167	173	178	166	196	200	254	193	228	249	2685	11.43
Two Authors	146	138	140	120	144	175	189	183	169	191	219	232	194	238	212	2690	11.45
Three Authors	152	164	186	184	171	206	220	214	213	212	239	267	233	229	259	3149	13.41
Four Authors	155	180	168	174	146	194	225	237	217	243	230	285	242	231	264	3191	13.59
Five Authors	142	143	191	184	155	190	191	215	206	217	221	226	250	250	227	3008	12.81
More than Five Authors	230	281	297	332	325	423	462	591	597	666	775	884	897	946	954	8660	36.87
Anonymous	5	5	2	4	2	6	8	4	6	4	19	6	9	11	13	104	0.44
Total	1000	1035	1109	1126	1077	1361	1468	1622	1574	1729	1903	2154	2018	2133	2178	23487	100.00

TABLE III AUTHORSHIP PATTERN IN CHRONIC LIVER DISEASES FROM 1999 TO 2013

Authors	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	No. of records	%
Single Author	291	303	286	363	296	346	309	307	296	270	312	286	321	299	293	4578	8.53
Two Authors	256	302	314	336	358	405	421	385	418	446	464	469	514	519	569	6176	11.50
Three Authors	281	278	302	310	315	326	365	333	386	405	393	467	440	469	571	5641	10.51
Four Authors	247	260	272	316	307	339	347	367	414	366	398	417	472	499	559	5580	10.39
Five Authors	291	287	297	289	323	355	355	403	392	394	383	436	414	431	563	5613	10.45
More than Five Authors	990	1048	1097	1204	1338	1417	1645	1683	1799	1808	1922	2042	2350	2571	2987	25901	48.24
Anonymous	17	16	17	20	16	10	14	7	17	18	9	9	7	14	10	187	0.35
Total	2373	2494	2585	2838	2953	3198	3456	3485	3722	3707	3881	4126	4518	4802	5552	53690	100.00

Data in Table 4 reveals the state of authorship pattern. As already mentioned multiple authors' papers constitute the major percentage. However, it was noticed that a meager percent (0.40%) represent anonymous authorship. The ratio of single and multi authored papers is 1:9. The high incident by multiple authorship is the phenomena of scientific research. (Figures 4 and 5).

Degree of Collaboration

The Degree of Collaboration of authors by year wise is shown in Table 5. The extent of Degree of Collaboration in Chronic Liver Diseases research has been measured with the help of the formula devised by K. Subramaniam²⁴.

The formula is

$$C = Nm / Nm + Ns$$

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TABLE IV SINGLE VS MULTI AUTHORED PAPERS IN CHRONIC LIVER DISEASES RESEARCH

Year	Anonymous		Single Authored		Multi Authored		Total	%
	Papers	%	Papers	%	Papers	%		
1984	5	0.50	170	17.00	825	82.50	1000	1.30
1985	5	0.48	124	11.98	906	87.54	1035	1.34
1986	2	0.18	125	11.27	982	88.55	1109	1.44
1987	4	0.36	128	11.37	994	88.28	1126	1.46
1988	2	0.19	134	12.44	941	87.37	1077	1.40
1989	6	0.44	167	12.27	1188	87.29	1361	1.76
1990	8	0.54	173	11.78	1287	87.67	1468	1.90
1991	4	0.25	178	10.97	1440	88.78	1622	2.10
1992	6	0.38	166	10.55	1402	89.07	1574	2.04
1993	4	0.23	196	11.34	1529	88.43	1729	2.24
1994	19	1.00	200	10.51	1684	88.49	1903	2.47
1995	6	0.28	254	11.79	1894	87.93	2154	2.79
1996	9	0.45	193	9.56	1816	89.99	2018	2.61
1997	11	0.52	228	10.69	1894	88.80	2133	2.76
1998	13	0.60	249	11.43	1916	87.97	2178	2.82
1999	17	0.72	291	12.26	2065	87.02	2373	3.07
2000	16	0.64	303	12.15	2175	87.21	2494	3.23
2001	17	0.66	286	11.06	2282	88.28	2585	3.35
2002	20	0.70	363	12.79	2455	86.50	2838	3.68
2003	16	0.54	296	10.02	2641	89.43	2953	3.83
2004	10	0.31	346	10.82	2842	88.87	3198	4.14
2005	14	0.41	309	8.94	3133	90.65	3456	4.48
2006	7	0.20	307	8.81	3171	90.99	3485	4.52
2007	17	0.46	296	7.95	3409	91.59	3722	4.82
2008	18	0.49	270	7.28	3419	92.23	3707	4.80
2009	9	0.23	312	8.04	3560	91.73	3881	5.03
2010	9	0.22	286	6.93	3831	92.85	4126	5.35
2011	7	0.15	321	7.10	4190	92.74	4518	5.85
2012	14	0.29	299	6.23	4489	93.48	4802	6.22
2013	10	0.18	293	5.28	5249	94.54	5552	7.19
Total	305	0.40	7263	9.41	69609	90.19	77177	100.00

where

C = Degree of Collaboration in a discipline

Nm = Number of multiple authored papers

Ns = Number of single authored papers

Accordingly, the Degree of Collaboration has been calculated for the year 1984 is as follows:

$$C = \frac{825}{825 + 170} = \frac{825}{995} = 0.83$$

Likewise the Degree of Collaboration is calculated for every year and presented in the Table 5.

The year wise Degree of Collaboration falls between 0.83 to 0.95. The Degree of Collaboration for any subject

TABLE V DEGREE OF COLLABORATION IN CHRONIC LIVER DISEASES 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
1984	5	170	146	152	155	142	230	1000	825	0.83
1985	5	124	138	164	180	143	281	1035	906	0.88
1986	2	125	140	186	168	191	297	1109	982	0.89
1987	4	128	120	184	174	184	332	1126	994	0.89
1988	2	134	144	171	146	155	325	1077	941	0.88
1989	6	167	175	206	194	190	423	1361	1188	0.88
1990	8	173	189	220	225	191	462	1468	1287	0.88
1991	4	178	183	214	237	215	591	1622	1440	0.89
1992	6	166	169	213	217	206	597	1574	1402	0.89
1993	4	196	191	212	243	217	666	1729	1529	0.89
1994	19	200	219	239	230	221	775	1903	1684	0.89
1995	6	254	232	267	285	226	884	2154	1894	0.88
1996	9	193	194	233	242	250	897	2018	1816	0.90
1997	11	228	238	229	231	250	946	2133	1894	0.89
1998	13	249	212	259	264	227	954	2178	1916	0.88
1999	17	291	256	281	247	291	990	2373	2065	0.88
2000	16	303	302	278	260	287	1048	2494	2175	0.88
2001	17	286	314	302	272	297	1097	2585	2282	0.89
2002	20	363	336	310	316	289	1204	2838	2455	0.87
2003	16	296	358	315	307	323	1338	2953	2641	0.90
2004	10	346	405	326	339	355	1417	3198	2842	0.89
2005	14	309	421	365	347	355	1645	3456	3133	0.91
2006	7	307	385	333	367	403	1683	3485	3171	0.91
2007	17	296	418	386	414	392	1799	3722	3409	0.92
2008	18	270	446	405	366	394	1808	3707	3419	0.93
2009	9	312	464	393	398	383	1922	3881	3560	0.92
2010	9	286	469	467	417	436	2042	4126	3831	0.93
2011	7	321	514	440	472	414	2350	4518	4190	0.93
2012	14	299	519	469	499	431	2571	4802	4489	0.94
2013	10	293	569	571	559	563	2987	5552	5249	0.95
Total	305	7263	8866	8790	8771	8621	34561	77177	69609	0.91

ranges from 0.01 to 0.99 and it is always below 1 which has been proved by Bandyopadhyay¹³ in different disciplines such as Mathematics, Physics and Mechanical Engineering.

Pattern of Co-Authorship Index (CAI)

In order to find out how the patterns of co-authors have changed during 1984 to 2013, the formula of Co-Authorship

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

Index (CAI) suggested by Garg and Padhi¹⁴ has been used.

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

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;

$j = 1, 2, 3, 4, 5$

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 five blocks as per the procedure laid down in the formula and the results of CAI given in Table 6. It is observed from the Table 6 that the value of CAI for single author papers during 1984-1989 were highest (134.81) which started declining in other blocks. Similarly, for two authored papers, during 1984-1989, the CAI was 112.39, and started declining in other blocks. The CAI for multi authored papers was

TABLE IV PATTERN OF CO-AUTHORSHIP INDEX (CAI) BY YEAR WISE

Sl.No.	Year	Single Author	Two authored	More than Two authors	Total
1	1984-1989	848 (134.81)	863 (112.39)	4973 (94.06)	6684
2	1990-1995	1167 (119.20)	1183 (98.99)	8053 (97.86)	10403
3	1996-2001	1550 (120.24)	1516 (96.34)	10632 (98.12)	13698
4	2002-2007	1917 (104.10)	2323 (103.34)	15328 (99.03)	19568
5	2008-2013	1781 (71.36)	2981 (97.85)	21757 (103.72)	26519
Anonymous					305
Total		7263	8866	61048	77177

lowest (94.06) in the first block and enhanced to 103.72 in the fifth block period from 2008 to 2013. This indicates that the team work in Chronic Liver Diseases research is in increasing trend.

VIII. CONCLUSION

More than 90% of the total contributions represent the collaborative research. The degree of collaboration has been arrived at 0.91 during the study period. The value of Co-Authorship Index (CAI) for single author paper shows a declining trend from one block year period to another block. On the other hand for multi authored papers the Co-Authorship Index reveals an increasing trend.

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