RELATIVE GROWTH RATE AND PRIORITY INDEX OF JOURNAL OF CLINICAL MICROBIOLOGY DURING 2006 – 2010

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ABSTRACT

The study examined bibliometric analysis of relative growth rate and priority index of the Journal of clinical microbiology. The periods between 2006 and 2010 are taken for this present study. The study covers the publication output, Relative growth rate and doubling times of the productivity, Subject-wise productivity, Priority and specialization index, Authorship Pattern and Degree of collaboration.

KEYWORDS: Bibliometrics, Relative growth Rate, Priority & Specialization Index

BIBLIOMETRIC STUDY

Bibliometrics is the application of mathematical and statistical methods to books and other media of communication and has recently drawn the attention of serious workers in Library and Information Science from both the theoretical and practical points of view. Theoretically it is the quantitative characterization of the properties of recorded discourse and its various important properties. Since practice is always backed by theory, bibliometrics also provides knowledge-benefits at the professional level.

Bibliometrics has emerged as a thrust area of research, incorporating different branches of human knowledge. It is a fast developing area in information science, which is defined as a discipline that investigates the properties and behavior of information. The definition and purpose of bibliometrics is to shed light on the process of written communications and of the nature and course of a discipline (in so far as this is displayed through written communication) by means of counting and analyzing the various facets of written communication according to Alan Pritchard[1], who coined the term 'bibliometrics' in 'Statistical Bibliography of Bibliometrics published in 1969 in the *Journal of Documentation*.

REVIEW OF RELATED LITERATURE

Sangam S.L and Keshava (2003)[2] have tried to explore the growth of world Social Science literature in the six sub disciplines viz., Anthropology, Economics, History, Psychology, Political Science and Sociology were derived from the CD-Rom version of the Wilson Social Science Abstracts for the period 1983–1998. Determines the rate of growth of the Social Science literature by calculating relative growth rates and doubling time for publications.

Wang-Huu Hsieh, Wen-Ta Chiu, Yee-Shuan Lee and Yuh-Shan Ho (2004)[3] have described the bibliometric analysis they have made to assess the quantitative trend of research on the treatment of Patent Ductus Arteriosus (PDA) treatment research, including intravenous injection of indomethacin and surgery. The documents studied have been retrieved from the *Science Citation Index* (SCI) for the period from 1991 to 2002. The publication pattern concerning authorship, collaboration, original countries, citation frequency, and document type, language of publication, and distribution of journals, page count and the most frequently cited papers have been performed.

Patra, Bhattacharya and Verma (2006)[4] analyzed the growth pattern, core journals and authors distribution in the field of bibliometrics, using data from Library and Information ScienceAbstract(LISA).

Krishnamoorthy.G, Ramakrishnan.J, Devi.S, (2009)[5] conducted a study on Bibliometric analysis of diabetes literature indexed the MEDLINE database for the period 1995-2004 which shows that maximum number of records (13244) was made during 2003, followed by 12690 in 2002 and 11061 in 2001. Relative Growth Rate (RGR) was found to be decreasing year wise. The Doubling Time (Dt) was found to increase every year. Ranking of the journals based on the quantum of research output on diabetes during 1995-2004 shows that USA is the largest contributor of literature on diabetes research. The research productivity of diabetes conforms to Bradford's Law of Scattering.

JOURNAL OF CLINICAL MICROBIOLOGY

Journal of Clinical Microbiology (JCM) publishes the most current research related to the laboratory diagnosis of human and animal infections and the role of the laboratory in both the management of infectious diseases and the elucidation of the epidemiology of infections.

Journal of Clinical Microbiology features:
- Commentaries
- Minireviews
- Editorials
- Point-Counterpoint
- Photo Quizzes
- Case Reports
- Fast-Track Communications

The scope of *Journal of Clinical Microbiology* includes:
- Bacteriology
- Chlamydiology and Rickettsiology
- Mycobacteriology and Aerobic Actinomycetes
- Mycology
- Parasitology
- Virology
- Clinical Veterinary Microbiology
- Epidemiology

AIMS AND OBJECTIVES

The present study is undertaken to have an in depth study of the JCM during the period 2006 - 2010. The study has been carried out with the following objectives:

- To measure the m o n t h - wise growth
- To measure subject – wise distribution
- To determine the relative growth rate and doubling time
- To determine the priority and specialization index
- To study the single v/s multi- author papers.
- To determine t h e degree of research c o l l a b o r a t i o n on Journal of Clinical Microbiology.

METHODOLOGY

The methodology applied in the present study is bibliometic analysis, which is used to study in detail the bibliographic features of the articles published in JCM from 2006 - 2010. For this the relevant data are collected and recorded. Then they are tabulated and analysed for making observations.

RESULTS AND INTERPRETATION

TABLE 1 YEAR WISE DISTRIBUTION

Year	Output	% of output	Cumulative	% of cumulative
2006	739	21.46	739	10.73
2007	654	19.00	1393	20.23
2008	660	19.17	2053	29.81
2009	648	18.82	2701	39.22
2010	742	21.55	3443	50.00
	3443	100.00	6886	100.00

Table 1 and Fig. 1 shows year wise article output from 2006 to 2010. 3443 articles were published within five years. Highest percentage of articles were published in the year 2010 and 2006 constituting 21.55 and 21.46 respectively. The years 2007, 2008 and 2009 contributed 19.00%, 19.17% and 18.82% respectively. It could be deduced from the above discussion that, among the study period the publication trend is increasing and decreasing. Highest percent of articles published in 2010 and the lowest percent of articles published in the year 2008.
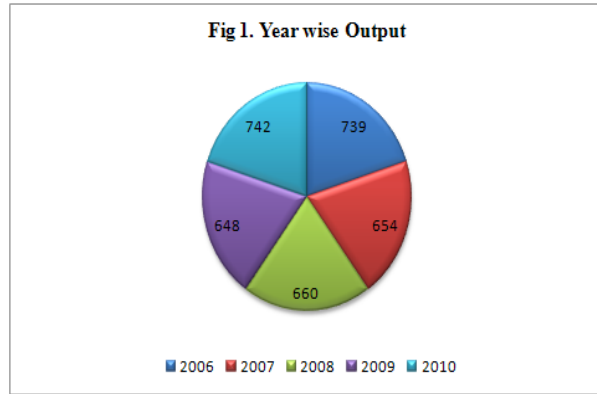
Fig 1. Year wise Output

TABLE 2 MONTH WISE DISTRIBUTION

Month	2006	2007	2008	2009	2010	Total
Jan	48	41	61	42	49	241
Feb	64	65	65	37	52	283
Mar	82	59	50	59	55	305
Apr	61	53	65	57	76	312
May	52	44	53	52	78	279
Jun	59	75	47	58	54	293
Jul	61	43	52	56	55	267
Aug	57	64	49	55	62	287
Sep	71	59	62	58	72	322
Oct	59	52	61	46	55	273
Nov	71	62	52	63	79	327
Dec	54	37	43	65	55	254
	739	654	660	648	742	3443

Here, an attempt was made to calculate the articles output in the form of during the period of twelve months from January to December on the year 2010. Table-2 and Fig-2 exhibits the month-wise distribution of number of articles. The average number of article publication was 688.6 articles per year. In the study, the months March, April, September and November have more than 300 articles during the period 2006 – 2010. The remaining eight months have below 300 articles. It could be deduced that the month November have higher productivity and the month January have lower productivity than the other months.
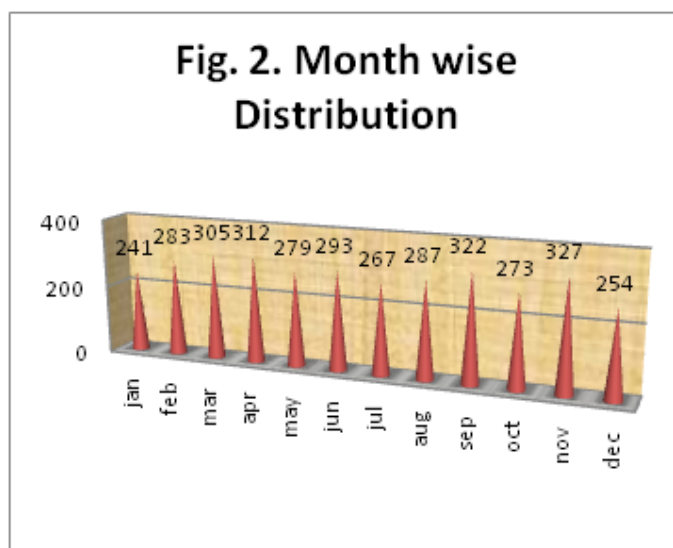
Fig. 2. Month wise Distribution

TABLE 3 RELATIVE GROWTH RATE AND DOUBLING TIME OF OUTPUT

Month	O / P	Cum O / P	W1	W2	R(a)	Mean (a) 1-2	Doubling time	Mean pt (a) 1-2
Jan	241	241		5.487				
Feb	283	524	5.487	6.261	0.774		0.90	
Mar	305	829	6.261	6.72	0.459	0.39	1.51	2.29
Apr	312	1141	6.72	7.039	0.319		2.17	
May	279	1420	7.039	7.258	0.219		3.16	
Jun	293	1713	7.258	7.446	0.188		3.69	
Jul	267	1980	7.446	7.59	0.144		4.81	
Aug	287	2267	7.59	7.726	0.136		5.10	
Sep	322	2589	7.726	7.859	0.133	0.12	5.21	6.24
Oct	273	2862	7.859	7.959	0.1		6.93	
Nov	327	3189	7.959	8.067	0.108		6.42	
Dec	254	3443	8.067	8.144	0.077		9.00	
	3443	6886	8.144			0.25		4.27

Table 3 discussed the relative growth rate of the articles during the months between January and December. The relative growth rate is the increase in the number of publications / pages per unit of time. The relative growth rate and doubling time model developed by Mahapatra (1985)[6].The overall study period has witnessed a mean relative growth rate is 0.25. Significantly, the doubling time for article output has decreased from 0.39 during January to June and to 0.12 in the months July to December. The whole study period has witnessed the mean doubling time for article output as 4.27. It could be deduced from the above discussion that the mean relative growth rate of article output has shown a declining trend. The Relative Growth rate value is decreased from 0.39 to 0.12 during the study period.

TABLE 4 SUBJECT WISE DISTRIBUTIONS

Subject	Years					Total No. of Articles	%
	2006	2007	2008	2009	2010		
Bacteriology	268	263	243	264	303	1341	38.95
Chlamydiology and Rickettsiology	11	12	24	8	6	61	1.77
Clinical Veterinary Microbiology	29	21	15	26	23	114	3.31
Epidemiology	78	50	76	58	74	336	9.76
Mycobacteriology and Aerobic Actinomycetes	80	45	49	56	72	302	8.77
Mycology	61	66	66	44	63	300	8.71
Parasitology	56	62	43	30	38	229	6.65
Virology	156	135	144	162	163	760	22.07
	739	654	660	648	742	3443	100.00

Table 4 and Fig. 4 shows the subject wise distribution. The most popular subject category among the authors of clinical microbiology is Bacteriology with 1341 articles out of 3443 (38.95%) followed by Virology with 156 articles (22.07%), Mycobacteriology and Aerobic Actinomycetes with 80 articles (8.77%) The next position is taken by Epidemiology 78 (9.76%) Mycology (8.71%) Parasitology (6.65%) Clinical Veterinary Microbiology (3.31%) and Chlamydiology and Rickettsiology (1.77%) were found to be the subjects of least interest for authors of the journal. From the above analysis, it can be inferred that more number of publications are made in the Bacteriology field whereas least number is made in the Chlamydiology and Rickettsiology field.
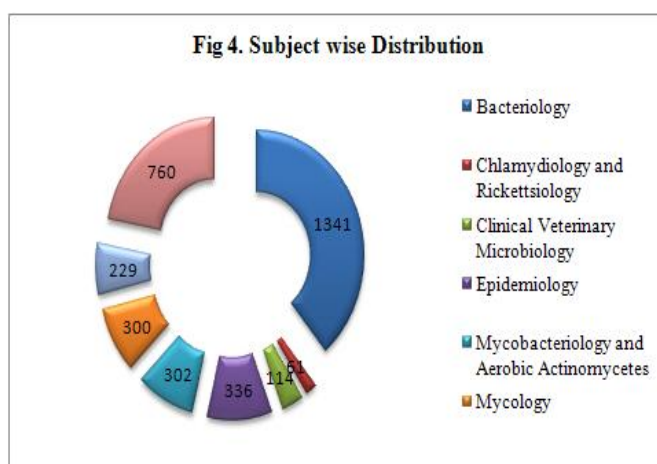

Fig 4. Subject wise Distribution

TABLE 5 PRIORITY AND SPECIALIZATION INDEX OF SUBJECTS OUTPUT

Subject	2006		2007		2008		2009		2010	
	P / I	S / I	P / I	S / I	P / I	S / I	P / I	S / I	P / I	S / I
Bacteriology	0.93		1.03		0.95		1.05		1.05	
Chlamydiology and Rickettsiology	0.84		1.04		2.05		0.70		0.46	
Clinical Veterinary Microbiology	1.19		0.97		0.69		1.21		0.94	
Epidemiology	1.08	1.04	0.78	1.02	1.18	1.10	0.92	0.93	1.02	0.91
Mycobacteriology and Aerobic Actinomycetes	1.23		0.78		0.85		0.99		1.11	
Mycology	0.95		1.16		1.15		0.78		0.97	
Parasitology	1.14		1.43		0.98		0.70		0.77	
Virology	0.96		0.94		0.99		1.13		1.00	
	8.32		8.12		8.83		7.46		7.31	

PI – Priority Index   SI – Specialization Index

The above table indicates the priority and specialization index values of the various subject fields during the years 2006 – 2010. The Priority index is proposed by (Frame, 1977)[7] and subsequently used among others by Schubert and Braun (Schubert and Braun, 1986 and Carpenter, et al.1988)[8, 9]. The Specialization index is being frequently used and termed 'widespread', often being given a different name. It is frequently called the "revealed scientific advantage" in the Anglo-Saxon world (Soete and Wyatt, 1983)[10], while trend researchers may use the term "Indice d'effort Specifique" (Filiatreans et al., 2003)[11].In the years 2006, 2007 and 2010 only four subjects have the PI values higher than 1 (PI>1); so these subjects have higher priority. The remaining four subjects have lower than average priority (PI<1); so these subjects have lower priority and   In the years 2008 and 2009 only three subjects have higher priority and the remaining five subjects have lower priority.

Based on the specialization index, all the subjects have specialized relation to the research output during 2006 - 2010, because these subjects SI value is 1 and greater than 1. It could be seen that the overall subjects in the years have achieved the SI value greater than 1, so it in specialized relation to the whole output.

TABLE 6 DISTRIBUTION OF OUTPUT IN SINGLE AUTHORED VS MULTI AUTHORED ARTICLES

Year	Single authored		Multi authored		Total	
	Output	%	Output	%	Output	%
2006	5	35.71	734	21.41	739	21.46
2007	1	7.14	653	19.04	654	19.00
2008	1	7.14	659	19.22	660	19.17
2009	4	28.57	644	18.78	648	18.82
2010	3	21.43	739	21.55	742	21.55
	14 (0.41)	100.00	3429 (99.59)	100.00	3443	100.00

Table 6 depicts the proportion of single author Vs multi authored papers during the study period. It could be noted that out of the total 3443 articles, only 0.41 percent of them have single authored distribution and the rest 99.59 percent of them are multi authored distribution on JCM. A keen observation of the above table shows that multi authored distribution occupies a very high level compared to single author contribution and the degree of collaboration (Subramanyam. K, 1993)[12] is 1.00 (Table 7).

TABLE 7 DEGREE OF COLLABORATION

	Single authored	Multi authored	Output	Collaboration
2006	5	734	739	0.99
2007	1	653	654	1.00
2008	1	659	660	1.00
2009	4	644	648	0.99
2010	3	739	742	1.00
	14	3429	3443	1.00

CONCLUSION

From the observations made in this study, it can be concluded that:

The journal published 3443 articles during the period of study. 2010 shows the highest number of contributions (21.55%). The month of November has maximum number of issues (327). The finding of overall growth rate of publication has shown more or less a similar trend. Consequently the mean doubling time for publications has shown an increasing trend. The present study reveals that the highest number of articles have appeared in the area of Bacteriology. From the above analysis multi authored contributions (99.49%) occupied

extreme position.   Single authored contribution is very few with (0.41%). Degree of collaboration of authorship pattern indicates the trend towards collaborative research.

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