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A Bibliometric Study of articles published in Surgery Journals during 2000-2005

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Abstract

Bibliometrics is used to study quantitative data and to analyse articles, books and other publication. This paper presents a bibliometric analysis of six journal of surgery for the period between 2000-2005. The objective of this study is to estimate the research productivity in the field of surgery. The sample comprises 6261 articles from six surgery journals. This was used to identify core journal, authorship pattern, ranking of surgery authors and yearwise distribution of paper. Three laws of Bibliometric was applied. All the studies indicate the advantages of the journals which will be helpful to the researchers / scientists.

Keywords: Bibliometrics Study, Bibliometrics Laws, Collaborative Authorship.

Introduction

Bibliometrics or quantitative studies is the study of publication patterns of any specific field of study. Bibliometrics is a set of methods used to study or measure texts and information of a particular field. Apart from discipline of library and information science, it is widely used in other subjects also. As information plays a very important role in the analysis and development of the subject, it is Bibliometric technique which organize published/unpublished source of information. As S.R. Rangnathan established five laws of library science, for the proper functioning of library, so has Prof. Bhattacharya five principles of information. The main objective of library and information system is to satisfy the information needs of the user.

According to Vijaya Kumar, the term 'bibliometrics' has a very recent origin. Pritchard suggested the word 'Bibliometrics' in 1969 in preference to statistical bibliography to indicate a new discipline which employs quantitative methods for analyzing various aspects of written documents. Its origin can be traced back to the efforts of early twentieth century document, in a list to apply mathematical and statistical analysis to bibliographical units. The classical work of Pritchard, Fairthorne, Lotka, Bradford, Zipf are worth mentioning in this context. Bibliometrics is a quantitative evaluation of publication patterns of all macro and micro communication along with their mathematical and statistical calculations.

Implications for Practice

The list of core journals in the field of surgery, serves as a tool for librarians in selecting the journals.

Review of Literature

Takahashi CK, Hoshuyama (T) and others (1996) carried out the study to find out the role assumed by epidemiology in occupational health literature and characterized its change over the years. A bibliometric research was done with a MEDICINE search to study articles in occupational health journals for a period of 1980-1993. Epidemiology was indexed most frequently as a subheading associated with other descriptors, for example, occupational diseases-epidemiology.

Andres (Ana) (2007) carried out the bibliometric study of the of the Transtheoretical Model (TTM) and obesity, which is recently one of the most important methods in terms of understanding and promoting behaviour change related to the acquisition of healthy living habits. By means of a bibliographic search of papers adopting a TTM approach to obesity, the bibliometric study enables the scientific output in this field to be evaluated. The results obtained reveal a growing interest in applying this model to both the treatment of obesity and its prevention author and journal output fit the models proposed by Lotka and Bradford respectively.

Patra (S, K) and Mishra (S) (2006) study about the bioinformatics, analyse the growth of the scientific literature in this area as available from NCBI Pub Med using standard bibliometric techniques. Bradford's Law of scattering was used to identify core journals and Lotka's Law was employed to analyze author productivity pattern. Core journals were identified and primary mode of dissemination of information was through journal articles, authors with single publication were more dominant contrary to that produced by Lotka's law.

Falagus, (Matthew E), Michalop (AS) and others (2006) did a bibliometric analysis on geographic area of published research in several biomedical fields, 1995-2003 for the findings of several studies were summarized to compare the quantity and quality of published research from around the world for the years 1995-2003. They also studied the research productivity of various areas adjusted for gross domestic product and population. United States ranked first in the field of preventive medicine, public health and epidemiology both in quantity (49.1%) and quality of published papers. After adjusting GDP, Canada ranked first with the United States and Oceania following closely behind. All the developing regions have small contribution.

In another bibliometric study on food science and technology scientific production in Iberian American countries (1991-2000) done by Alfaraz, PH and Calvino (Amalia Nitra) (2004) presents a bibliometric analysis of the literature in the food science and technology production in the food science and technology (EST) field for the period 1991-2000, in Iberian American (IA). Eight selected IA countries contributed 97.6% of the IA production and accounted for a 6.6% of the world production. The most frequent document type is the journal article published in English. The fifty top ranked journals, 80% of which were indexed by the SCIE encompass two-third of the IA production.

A bibliometric analysis was done by Garcia-Lo'per (JA) (1999) on Spanish Scientific publication on tobacco use during the period 1970-1996, were studied including all published work carried out in Spanish institutions indexed in Indice Medico Espanol (IME) or in MEDLINE and available on CD ROM. A total of 405 papers were found by IME published in Spanish Journals and another 194 in MEDLINE. The degree of collaboration between authors, research centers and institution was 88.6%, 30.7% and 21.8% respectively. The Spanish papers were published in 83 Spanish Journals of which 36 (43.4%) published just one paper and in 124 foreign journals of which 85 (68.5%) published a single paper. The average number of authors per paper was 4.02 and 2.46 in Spanish journals and 4.96 ± 2.26 in foreign ones. Total number of authors was 1633 of whom 1162 (71.2%) appeared in a single paper.

Need for the Study

The periodicals are the indicators of literature growth in any field of knowledge. For selecting the most important journal in university libraries, application of bibliometric technique has become a must. This will help the librarian in developing a better collection and providing better information services.

Owing to the escalating cost of the periodicals and lack of adequate library budgets, the selection of journals for a library should be done more carefully. The library authority are forced to reduce the number of subscriptions.

Since bibliometric analysis has many applications in the library and information science field in identifying the research trends in the subject core journals etc. and thereby forming new subscription policy for tomorrow, these studies will be helpful for librarians to plan a better collection development

Objectives of the Study

The basic objective of bibliometrics is the study of the size, growth and distribution of scientific documents. The objective was:

1. To analyse the paper published in the volumes of surgery journals during the period 2000-2005.
2. To know the authorship pattern.
3. To know the leading contributors/scientists.
4. To determine the ranking of journals.
5. To know the most used language.

Methodology

For the bibliometric study the following selected journals are taken for the quantitative study of specific texts on surgery under the subject heading of 'surgery'. All the original articles were considered, excluding editorials, review articles, letters to the editor. A total of 6261 articles were collected from databases, PubMed, Medline, Journals, the search was restricted to published articles. The analysis focus on the growth of literature, authorship pattern, most prolific authors, core journal of the subject.

Lotka's law and Bradford Law of scattering was applied to count the author productivity and core journals of the subject. In addition to this document analysis, calculation of percentage, graphical representation and statistical analysis are also used.

Data Analysis and Discussion

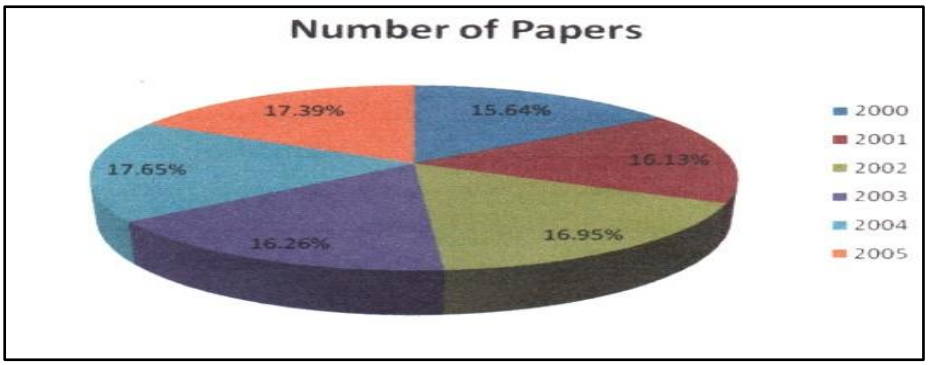
A total of 6261 papers published by surgeons in the six journals of surgery were selected for analysis. The data collected was tabulated and analyzed. The analysis focus on the growth of literature, authorship pattern, most prolific authors, core journal of the subject and most preferred language.

TABLE NO. 1

S.No.	Year	No. of Papers	%
1	2000	979	15.64%
2	2001	1010	16.13%
3	2002	1061	16.95%
4	2003	1018	16.26%
5	2004	1104	17.63%
6	2005	1089	17.39%
Total		6261	100.00%

Table 1 shows the chronological distribution of papers during the period 2000-2005. The table shows that the highest number of papers was published in the year 2004 (17.63%) and the lowest in the year 2000 (15.64%). There was marginal difference in the number of papers published during the year 2000-2005.

Graph 1



Authorship Pattern

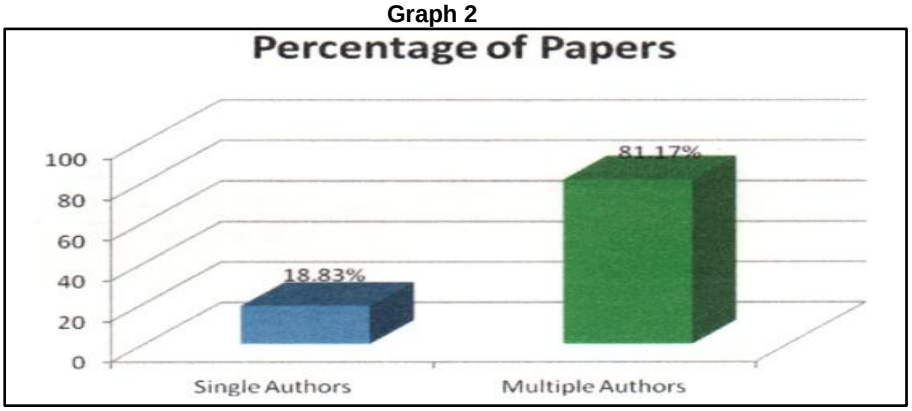
Table No. 2

Single Authorship		Multiple Authorship		Total No. of Authors
No. of Authors	%	No. of Authors	%	
1179	8.69%	12,403	91.31%	13.582

Single Authorship		Multiple Authorship		Total No. of Articles
No. of Articles	%	No. of Articles	%	
1179	18.83%	5082	81.17	6261

Table 2 shows the pattern of authorship in terms of single and multiple authorship. It was deduced from the findings that collaborative authorship was more dominant. The dominance of joint authorship indicates the emergence of team work in research activities as shown in the table 2 single authors constitute 8.69% while multiple authorship 91.31% which is out of total 13,582 author. In case of 6261 articles, 18.83% were written by single author and 81.17% by joint authors.

Graph 2



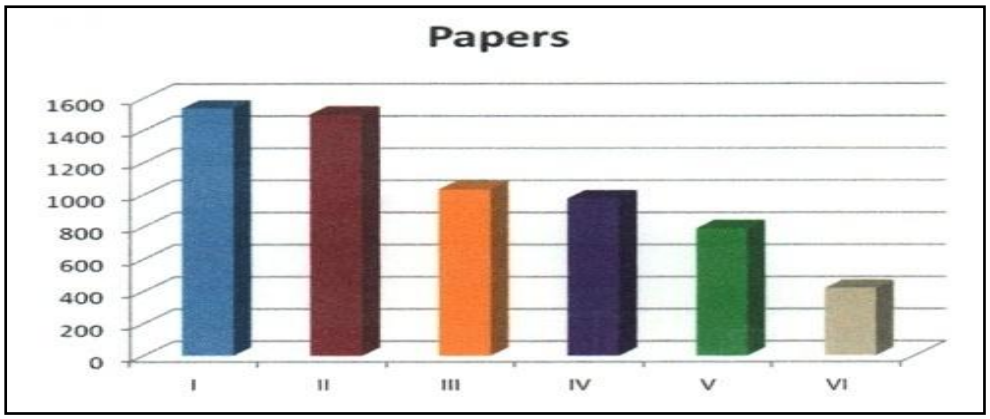
Ranking of Surgery Journals

Table No. 3

S.No.	Name of the Journal	Total No. of Article published	Rank
1	American Journal of Surgery	1539	I
2	British Journal of Surgery	1500	II
3	Annals of Surgery	1034	III
4	Archive of Surgery	977	IV
5	ANZ Journal of Surgery	791	V
6	Canadian Journal of Surgery	420	VI

Six journals of surgery was analysed for the study, an attempt was also made to identify the core journals and to quantify growth and diversification in various facets of research. Table 3 shows the comparative study of journals in terms of publications / productivity. Among the six journals, American Journal of Surgery being the highest with 1539 articles out of 6261 and Canadian journal of surgery with 420 articles being the lowest.

{Graph 3}

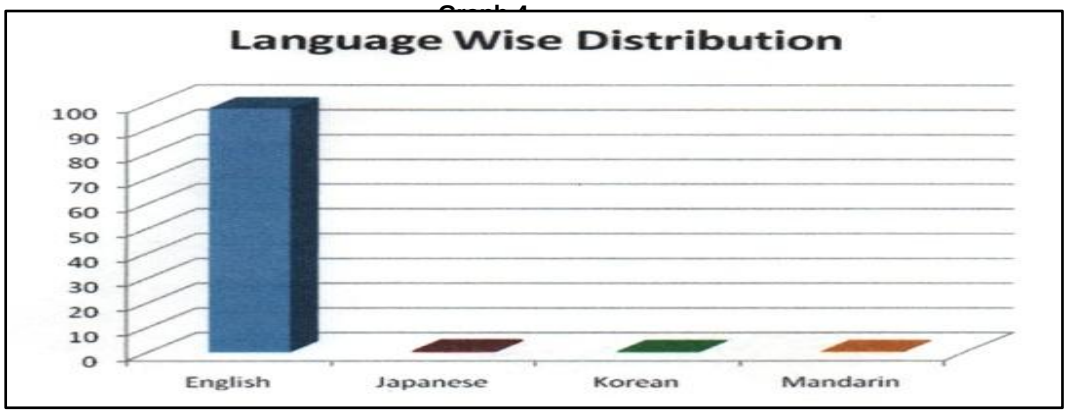


Language wise Distribution of Surgery Papers

Table No. 4

S.No.	Language	2001	2001	2002	2003	2004	2005	%
1	English	962	994	1049	1004	1090	1071	98.55%
2	Japanese	8	7	4	6	7	9	0.65%
3	Korean	5	4	5	4	5	4	0.43%
4	Mandarin	4	5	3	4	2	5	0.37%
Total								100%

As medium is important part for the dissemination of information, so analyzing language is an important area in the study of bibliometrics. The table shows the most commonly used language in the subject. English being the dominant with 98.55% and the least was Mandarin with 0.37%.



Ranking List of Surgery Authors

Table No. 5

S.No.	Rank	Authors	2000	2001	2002	2003	2004	2005	Total
1.	I	Letts, M.		2	1		2	6	11
2.	II	Poon, Ronnie T		3	1	3	2	1	10
3.	II	Lo, Chung-Mau		3	4	2	1		10

Six journals of surgery analysed between the period of 2000-2005, with 6261 articles. These articles were contributed by 13,582 authors among them the highest being M. Letts with 11 articles, followed by Ronnie T. Poon and Chung Mau Lo with 10 articles each. Other authors follow in the list in the decreasing order of number of articles written by them.

Application of Bibliometric Laws

Three fundamental bibliometric laws are:

1. Bradford's law of scattering of scientific papers.
2. Lotka's inverse square of scientific productivity.
3. Zipf's law of word occurrence.

Bradford's law

Samuel Clement Bradford is considered to be the pioneer in the field of Bibliometrics. According

to Bradford the periodicals are ranked by diminishing productivity, Bradford identified three groups of periodicals that approximately produce the same number of articles on the subject but these three zones are equiproductive in items of periodicals and is increased by constant factor.

Bradford's law states that journals in a single field can be divided into three parts each containing the same number of articles:

1. First zone containing the core of journals on the subject, relatively few in number, that produce approximately one third of all the articles.
2. Second zone, containing the same number of articles as the first, but a greater number of journals.
3. Third zone, containing the same number of articles but still a greater number of journals. The mathematical relationship of the number of journals in the core to the first zone is a constant and to the second zone the relationship is n^2 Bradford expressed this relationship as 1: n: n^2

Bradford also plotted a graph known as Bradford Bibliograph.

Total number of articles is 6261.

Total number of journals is 6.

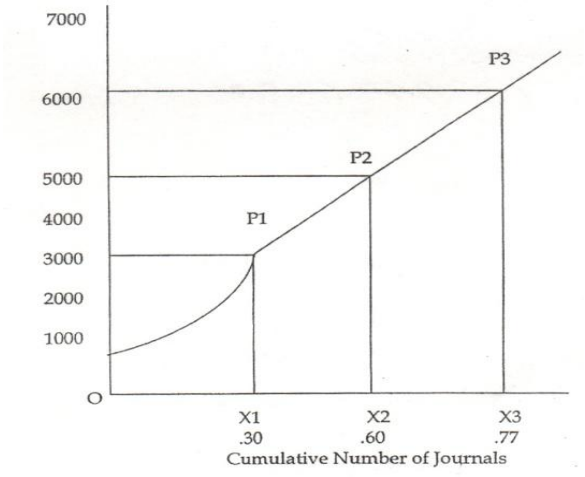
2 journals constitute 3039 articles.

4 journals constitute 5050 articles.

6 journals constitute 6261 articles.

Bradford's law serves as a general guideline to librarians in determining the number of core journals in any given field

Bradford Bibliograph



Lotka's Inverse Square Law of Scientific Productivity

In 1962, Alfred J. Lotka proposes an Inverse Square law which describes the frequency of publication by authors in a given field.

Lotka indicates that the number of authors that published a certain quantity of works is inversely proportional to the square of these works.

$A(R) = A(1)/R^2$

Where A (R) is the number of authors that publish R work, R is the number of works that an author publishes and A (1) is the number of authors that publish only one work.

Owing to multiple authorship the number of authors have increased. Many authors contribute a single article, thus the law is not proved at any stage.

ZIPF'S Law of Word Occurrence

Zipf's equation is r x f = K

Where, r is the rank of word, f is the frequency and K is the constant (Potter 1988).

As the law states that in a relatively lengthy text, if you list the words occurring within that text in order of decreasing frequency, the rank of word, on that list multiplied by its frequency will equal a constant. Zipf s law is not statistically perfect, but it is very useful for indexers. The law is not applied as it deals with long textual matter of the articles.

Conclusion

Bibliometric technique are being used for many purposes like determination of scientific indicators, and selection of journals for libraries. The result from this study underscore the important surgery journals. These findings have thrown light on the variety of information sources on which the scientists depend which in turn help provide better information services to the scientists related to the subject and also in improving the existing services. The results of the analysis produce the following major findings.

1. During the period 2000-20005, the paper distribution being the highest in the year 2004.
2. For studying the authorship pattern, multiple authorship being dominant with 91.31% as in comparison to single authorship.
3. The data shows that among the authors who top the list was Letts, M. with 11 papers followed by Poon, Ronnie T and Lo, ChungMau with 10 papers each and the rest follow with lesser paper in the list.
4. The study reveals that among the journals, American Journal of Surgery publish highest number of papers i.e. 1539 out of 6261.
5. The data shows that English was most preferred language with 98.55%.

From the library and information point of view it is essential to evaluate and study the research trends from time to time so that it would be easy for managing the various information services and products to cater the information needs of researchers effectively.

References

Andre's Ana and Others, Transtheoretical Model and Obesity -Scientometrics 2007; 73(3): pp. 289-301.

Alfaraz, PH and Calvino (AM) Bibliometric study on food science and technology scientific productioin in Iberian American Countries (1991-2000) Scientometrics, 2004: 61(3).

Devarajan, G. Bibliometric Studies, 1997: pp. 1-294.

Falagus (ME) and others. A bibliometric analysis by geographic area of published research in several biomedical fields, 1995, 2003, CMAJ, 2006; 175(11): pp. 1389-90.

Garcia - Lopez (JA): Bibliometric analysis of Spanish Scientific publications on tobacco use during the period 1970-1996. European Journal of Epidemiology 199; 15(1): pp. 23-28.

Google search engine.

Maheswarappa, BS. Bibliometrics: an overview. Bibliometric Studies 1997; pp. 1-7.

Patra (SK) and Mishra (S). Bioinformatics, Scientometrics, 2006: 6(3): pp. 477-489.

Vijaya Kumar, KP. Applications of Bibliometrics in Libraries and Information Centres, Bibliometric Studies, 1997; pp. 19-32.

Takahashi K and Others. A bibliometric study of the trend in articles related to epidemiology published in occupational health journals. Occup. Environ. Med. 1996, 53(7): pp. 433-438.