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INDIAN JOURNAL OF MEDICAL RESEARCH – AN ANALYSIS OF CITATION PATTERN

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ABSTRACT: *The study is based on 781 citations appended to 43 research articles pertaining to January to June 2000 issues of volume 109 of Indian Journal of Medical Research. The authorship pattern of the citations shows that more than 15 per cent contributions are single-authored and about 85 per cent are the result of teamwork. The team size of this field is bigger than those in the fields of chemistry and physics. Single-authored articles amount to 15.52 per cent of the total citations and about 28 per cent resulted through the collaboration of five or more authors. Of the citations 88.73 per cent pertain to journal articles. Of the citing articles 38 contributed by Indian authors, 3 by foreign authors and 2 jointly by Indian and foreign authors. Of the total citations 9.48 per cent are author self-citations and 7.3 per cent are journal self-citations.*

KEYWORDS: *Indian Journal of Medical Research;* Citation analysis; Scientometrics; Medical periodicals

INTRODUCTION

We can really be proud of the fact that Ayurveda, the world's oldest system of medicine which is still extant originated from India in the second millenium BC. Evidences suggest that the Aryans absorbed in Ayurveda the knowledge of medicine which people of Indus Valley civilisation possessed With the passage of time Indians contributed more and more to medical knowledge inherited from Ayurveda and enriched it. For example, the contributions of Buddhists scholars to medicine is highly significant. The progress of Ayurveda which continued over several millennia came to a grinding halt in 1200 AD [1].

In 1750s medical officers were appointed by the East India Company to serve the British Army. As they were trained in the modern system of medicine popularly known as Allopathy, it is through them the System got implanted in India [2]. It took a little more than a century for the introduction of Homeopathy in this land. Medical articles started publishing from the year 1790 inasmuch as two articles appeared in the 2nd volume of *Asiatick Researches* published in that year. It is interesting to know that the article entitled 'On the cure of elephantiasis' was by an Indian called At'har Ali. Incidentally, this is the first article on a scientific subject by an Indian published in *Asiatick Researches*. The second article was on the cure of persons bitten by snakes, by John Williams [3].

After *Asiatick Researches*, the second learned journal to appear from India is the *Transactions of the Medical and Physical Society of Calcutta.* The journal started in 1825 continued till 1845 producing nine volumes. Since then numerous medical journals enfolding Allopathy, Homeopathy, Ayurveda, etc. started publishing from India. An idea of the journals published on medicine from 1825 till recent times can be had from the publications of Neelameghan [4], Sen *et al* [5], Kumar [6] and Sen and Lakshmi [7]. Of about 450 Indian S & T periodicals being covered by at least one international abstracting and indexing services, about 80 (18%)are devoted to medicine. Of the Indian S & T periodicals, medical periodicals rank second next only to agriculture [7].

Despite India's rich medical heritage and winning of Nobel Prize for medicine by Ronald Ross in 1902 for his work done at Calcutta, India's contribution to medicine has been rather poor. Sambhu Nath De's outstanding work on cholera received recognition very late, and so far three Indians have been elected FRS on the subject. They are: A S Paintal (FRS – 1981), V Ramalingaswamy (FRS –1986), and C Gopalan

(FRS –1987). It is, of course, heartening to note that all the three have been elected FRS in the last two decades. If this trend continues, then we are sure to have many more FRSs in medicine in the twenty-first century.

For this study we have chosen *Indian Journal of Medical Research*, the topmost and one of the oldest among Indian medical journals and it is being covered by all important indexing and abstracting services of the world devoted to medicine. Some of the bibliometric indicators of the journal according to *Journal Citation Report* 1999 are: Impact factor 0.365; Immediacy index 0.056; and Cited half-life >10. *Science Citation Index* is covering it ever since its founding in 1963 without any interruption.

OBJECTIVES

The objectives of the study are to find out:

- Authorship pattern of citation
- Types and distribution of citations according to forms
- Percentage of Indian citations to foreign citations
- Percentage of author self citations to total citations
- Percentage of journal self citations to total citations

SCOPE

The study covers 43 research articles published in the January to June 2000 issues of volume 109 of *Indian Journal of Medical Research (IJMR*). These research articles included 781 cited items, i.e. citations. It is to be noted that *IJMR* allows the authors to use up to a maximum of 30 citations for each research article. The study indicates that on average a research article included about 18 citations.

METHODOLOGY

The data was compiled manually from the journal articles employing systematic sampling method. For each citation, the following data was recorded: (i) number of author(s), (ii) type of document, (iii) origin of the document/ journal, (iv) whether author self-citation, and (v) whether journal self-citation.

RESULTS AND ANALYSIS

Authorship pattern of citations

IJMR allows a maximum of six authors' names in each citation. For citations having more than six authors the first six names are given followed by *et al*. This practice definitely helps to save some space but does not allow the study of mega-authorship (, i.e. citations having ten or more authors) which is aplenty in the field of medicine. Out of 781 citations the distribution of authorship is shown for 754 citations (as the rest of them are not having any author) in Table 1.

Table 1: Authorship pattern of citations

Number of authors	Number of citations	Percentage	Rank
Single	117	15.52	3
Two	177	23.47	1
Three	130	17.24	2
Four	117	15.52	3
Five	78	10.34	6
Six	45	5.97	7
Seven or more	90	11.94	5
Total	754	100.00	

Table 1 shows that single-authored contributions account for 15.52 percent of the citations signifying that single-authored contribution in the field is still quite substantial. Teamwork was involved for the generation of 85.48 of the contributions. Unlike the fields of physics and chemistry where the team size mostly comprises two to four members [8, 9], the team size in the field of medicine is found to be bigger where more than 28 per cent of the contributions have resulted through the collaboration of five or more authors. The contribution generated through the collaboration of seven or more authors is also about 12 percent.

Distribution of citations according to forms

The citations pertain to various types of publications like journal articles, monographs, research reports, handbooks, manuals, conference proceedings, encyclopaedias, PhD dissertations, etc. In this study we observe that journal articles occupy the first position with a tally of 88.73 per cent followed by monographs occupying a very distant second position accounting for about seven per cent of the citations. In the coming days, researchers will use e-journals and other e-publications, though citations from those types of publications were not present here. The distribution of publications with the rank is given in Table 2.

Table 2: Types and distribution of publication of citations

Type	Number of citations	Percentage	Rank
Journal article	693	88.73	1
Monograph	55	7.04	2
Research Report	10	1.28	3
Handbook	9	1.15	4
Others	14	1.79	

Percentage of Indian citations

Out of 781 citations only 116 were Indian citations accounting for 14.85% of the total citations. Most of them were journal articles, published in the Indian journals. Compared to chemistry the percentage of Indian citations in medicine is much higher and compared to physics it is slightly higher [8,9]. Table 3 shows the distribution of publications and their percentage as per their origin.

Table 3: Ratio of Indian to foreign citations

Type	Number of Indian Citations	Number of Foreign Citations
1. Journal article	109 (13.96%)	584 (74.78%)
2. Monograph	2 (0.26%)	53 (6.79%)
3. Research Report	1 (0.13%)	9 (1.15%)
4. Handbook	0 (0.00%)	9 (1.15%)
5. Others	4 (0.51%)	10 (1.28%)

Citing articles

The authors of citing articles are found to be of three types: (i) Indian, (ii) foreign, and (iii) mixed. In this study, out of 43 research papers, 38 (88.37%) are published by Indian authors, 3 (6.98%) by foreign authors and 2 (4.65%) by both Indian and foreign authors jointly. This result shows that *IJMR* mostly publishes research papers contributed by the Indian authors. Why this journal is failing to attract foreign papers is difficult to explain. Maybe its visibility or its popularity among the medical researchers world over is low.

Author self citation

Self-citation occurs when an author cites any of his articles written singly or jointly with others. In this study we found 74 author self citations. That amounts to 9.48% of total citations.

Journal self citation

If an article cites any of the articles published in the same journal before then it is termed as a case of journal self citation (JSC). In this study we found 57 journal self-citation, which amounts to 7.3 percent of total citations. The JSC measures the popularity of the journal among the concerned scientific community. The percentage of JSC of *IJMR* is better compared to *Indian Journal of Pure and Applied Physics* [8] *Indian Journal of Chemistry Section A* [9]. The percentages of JSC of these two journals are 3.63 and 0.50 respectively. However, it is to be noted that 7.3 per cent JSC itself is quite low compared to the JSC of high impact journals.

CONCLUSION

IJMR started in 1913 and is one of the oldest Indian journals in the field of medicine. Because of its age, regularity of publication, visibility in the country and abroad, this can become a high impact journal in the world provided it starts publishing high quality papers contributed by Indian and foreign authors. Launching an Internet site for the journal is also likely to improve its visibility and to a certain extent its impact factor.

REFERENCES

1. Majumdar R C. Medicine. **In** *A Concise History of Science in India*. New Delhi: Indian National Science Academy,1971. P. 213 –268.
2. Subbarayappa B V. Western science in India up to the end of the Nineteenth Century AD. **In** *A Concise History of Science in India*. New Delhi: Indian National Science Academy,1971. P. 213 –268. P.538
3. Sen B K. *Indian Scientific Periodicals: A Study of the Origin and Development up to 1900* [PhD thesis]. Calcutta: Jadavpur University, 1994. P. 311-13.
4. Neelameghan A. *Development of Medical Societies and Medical Periodicals in India 1780 – 1920*. Calcutta: IASLIC, 1963.
5. Sen B K, Gera J C, Gogia K L, Rajagopalan T S. Reporting of Indian medical literature in the *Index Medicus* and *Excerpta Medica* – Appendix 2: List of [Indian] medical periodicals started publication after 1920. *Annals of Library Science and Documentation* 1966, 13(1), 10-17.
6. Kumar R P. *Research Periodicals of Colonial India 1780 – 1947*. Delhi: Academic Press, 1985.
7. Sen B K, Lakshmi V V. Indian periodicals in the *Science Citation Index*. *Scientometrics* 1992, 23(2), 291-318.
8. Dutta B, Sen B K. *Indian Journal of Pure and Applied Physics* – An analysis of citation pattern. Paper presented at the 19th IASLIC Seminar – SIG Informetrics, Bhopal, 13 –16 November 2000.
9. Dutta B, Sen B K. *Indian Journal of Chemistry Section A* – An analysis of citation pattern. Paper presented at the 19th IASLIC Seminar – SIG Informetrics, Bhopal, 13 –16 November 2000.