

## INDIAN JOURNAL OF PHYSIOLOGY AND ALLIED SCIENCES: AN ANALYSIS OF CITATION PATTERN

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*The present study covers 457 citations appended to 26 research articles published in the four issues of the quarterly Indian Journal of Physiology and Allied Sciences, vol. 55(2001). The articles are contributed by 75 authors (74 - Indian). From the citation count it appears that the solo research in physiology is quite substantial (about 24%). Though about 77% of the work is the result of team research, the team size is found to be small ranging from 2 to 5. Of the citations, 76.81 per cent relate to journal articles, 18.59 to monographs, and the rest to conference papers, theses, etc. The ratio of Indian to foreign citations is found to be almost 1:6. Of the total citations, 4.59 per cent are author self citations, and 2.84 per cent are journal self citations. Of the citing articles one is single-authored, 10 are two-authored, 9 three-authored, 4 four-authored, and one each five-authored and six-authored. No collaboration was noticed in the case of 23 citing articles. The remaining 3 articles were the results of two-institution collaboration.*

### INTRODUCTION

In India, the importance of physiology as a basic science was first realised by Professor Subodh Chandra Mahalanobis (1867-1953) who initiated the study of physiology as basic science outside medical colleges in order to spread the knowledge at the grass root level and obviously amongst the common people. He realised that it was essential for every human being to understand the mechanism of human body as the knowledge of physiological sciences contributes enormously in respect of nutrition, health and hygiene.

Prof Mahalanobis had his education in England and on return to India he introduced physiology as a basic subject in Presidency College under the University of Calcutta in both undergraduate and postgraduate levels in 1901 [1,2]. Due to his pioneering activities, the subject flourished tremendously and now the subject is taught in numerous schools and colleges all over India.

For further growth and development of the subject *Physiological Society of India* (PSI) was formed in 1935, *Association of Physiologists and Pharmacologists of India* (APPI) in 1955 and even a Section of Physiology was introduced in the *Indian National Science Academy* and *National Academy of Medical Sciences*. The PSI and APPI both are affiliated to the *International Union of Physiological Sciences* (IUPS), Paris, France. Recently *Federation of Indian Physiological Societies* and also *Federation of Asian Oceanian Physiological Societies* (FAOPS) have been formed to promote the growth of the subject in India as well as in other countries of Asia and Oceania.

Contributions of Indian physiologists are undeniably substantial. Sir Ronald Ross (1857-1932), an English surgeon, did pioneering work on Malarial parasite in Calcutta Presidency General Hospital (now known as SSKM Hospital) and got Nobel Prize for his work in 1902[1]. Prof. A.S. Paintal was elected FRS in 1981 for his most valuable work on Pulmonary J receptors. Contributions of other physiologists such as Prof B K Anand, Prof B Mukherjee, Prof Baldev Singh, Prof B Sarkar, Prof P Brahmayasastri, Prof S Mukherjee, Prof P B Sen, Prof S R Maitra, Prof R K Pal, and Prof B N Koley deserve special mention.

At present, a large number of research and teaching institutions devoted to physiology are functioning in India. A number of journals on physiological and allied sciences are also being published by various societies. Some of the journals are: *Indian Journal of Physiology and Allied Sciences* (f 1946); *Indian Journal of Physiology and Pharmacology* (f 1956); *Annals*

Table 1 - Distribution of Citations according to Authorship Pattern

No. of Authors	No. of Citations	Percentage	Rank
One	87	23.58	2
Two	114	30.89	1
Three	63	17.07	3
Four	45	12.20	4
Five	34	9.22	5
Six	09	2.44	6
Seven	04	1.08	8
Eight	02	0.54	9
Nine	02	0.54	9
Others	09	2.44	6
Total	369	100.00	

of the National Academy of Medical Sciences (India) (f 1964), etc. *Indian Journal of Physiology and Allied Sciences* has been selected for this study, as the journal is one of the oldest Indian journals on the subject. It has already completed 55 years and is still going strong maintaining the golden tradition of uninterrupted publication.

## OBJECTIVES

The objectives of the study are to find out :

- authorship pattern of citations,
- forms of documents cited,
- ratio of Indian citations to foreign citations,
- ratio of author self-citations to total citations,
- ratio of journal self-citations to total citations,
- author self-citation vs journal self-citations, and
- authorship and affiliation pattern of citing articles.

## SCOPE

The present study is based on 457 citations appended to 26 research articles published in four issues of quarterly published *Indian Journal of Physiology and Allied Sciences*, v.55(2001). The journal is the official organ of the Physiological Society of India. This indicates that on average each article has used nearly 18(17.50) references.

## METHODOLOGY

In this study, the references appended to each research article were scanned, counted and tabulated employing systematic sampling method. Finally for each reference the following elements were recorded, tabulated and analysed:

- a) number of authors,
- b) type of the document,
- c) country of origin of the document,
- d) author self-citations, and
- e) journal self-citations, wherever available

## RESULTS

### Authorship Pattern of Cited Articles

Out of 457 citations, 369 citations have been taken into consideration for this study, excluding 85 citations pertaining to books and 3 to corporate body or no authorship. The authorships of those citations ending with et al are classed under Others.

It is evident from Table 1 that 87(23.58%) out of 369 citations are single-authored. This indicates that solo research is quite substantial in this field. One hundred and fourteen (30.98%) contributions are by two authors and 63 (17.07%) by three authors. Two- and three-authored contributions account for 47.96 per cent of the total contributions. Joint contributions by three or more authors total nearly 22 per cent (21.42%). In all, nearly 73 per cent contributions are the results of team research. The team mostly comprises two to five researchers. The highest number of researchers involved in a team are found to be nine. Thus, there is no incidence of mega-authorship (i.e. papers jointly authored by ten or more authors) in this study.

### Citations according to forms

Journal articles predominate in scientific literature. This study also establishes the same. Table 2 shows that journal articles account for 76.81 per cent of the citations, followed by monographs - 18.59 per cent, and others - 4.60 per cent.

Table 2 - Distribution of Cited Documents according to Forms

Types of Documents	No. of Citations	Percentage	Rank
Journal Articles	351	76.81	1
Monographs	85	18.59	2
Conference Proc.	07	1.53	3
Thesis	03	0.66	4
Research Report	07	1.53	3
Manual	01	0.22	5
Others	03	0.66	4
Total	457	100.00	

Table 3 - Ratio of Indian to Foreign Citations

Forms	Indian Citations		Foreign Citations	
	Total	%	Total	%
Journal Articles	51	11.16	300	65.65
Monographs	12	2.63	73	15.97
Conference Papers	03	0.65	04	0.87
PhD Thesis	03	0.65	-	-
Research Reports	02	0.44	05	1.09
Manuals	-	-	01	0.21
Others	03	0.65	-	-
Total	74	16.14	383	83.79

Table 4 - Distribution of Citing Articles according to Authors

Author/s	Single	Two	Three	Four	Five	Six
Article/s	1 (3.84%)	10(38.46%)	9(34.62%)	4(15.38%)	1(3.84%)	1(3.84%)

### Indian vs Foreign Citations

It is generally observed that in the literature cited by Indian scientists there is a predominance of foreign documents [3,4]. It is but natural as in the world of scientific literature India's contribution is generally found to be less than 5%. It is found from Table 3 that out of 457 citations, only 74 citations are Indian and 383 are foreign. Thus, the ratio of Indian to foreign citations turns out to be 1:6. This ratio proves to be the same both in the case of journals articles as well as monographs. The number of citations involving other forms of documents is too low to provide any good indicator.

### Author Self Citations

In this study, 21 author self citations have been encountered that amounts to 4.59 per cent of total citations. The ratio of author self citations to total citations is found to be around 1:22.

### Journal Self Citation

Journal self citation (JSC) is also a bibliometric indicator that gives an indication about the popularity of the journal among its contributors as well as the user community. The percentage of self citations of many noted journals of the world

are found to be over 20 [5]. In this case, the percentage of journal self citation is found to be 2.84 which is quite low compared to the percentage of JSC of internationally reputed journals like *Plant Physiology* and *Clinical Physiology* whose JSC percentages for the year 1999 are 14.634 and 23.445 [5].

### Citing Articles

Citing articles refers to the articles published in a journal. Seventy-five authors have produced the 26 citing articles. Of these, 74 are affiliated to Indian institutions and one to a foreign institution. The fact indicates that the journal generally publishes articles contributed by Indian authors.

### Authorship Pattern of Citing Articles

The authorship pattern of citing articles differs widely from cited articles. In the case of citing articles only about 4 per cent are single-authored, whereas the figure for cited articles is as high as 24 per cent. Two-, three-, and four-authored articles account for 88.46 per cent of the articles which clearly indicate that team work is the order of the day. However, the study reveals that the team size is small.

## Collaboration

Out of 26 articles, institutional collaboration was noticed only in three cases where collaboration took place between two institutions.

## CONCLUSION

On the basis of the analysis it is observed that the journal is basically a local journal as it publishes a negligibly small number of research articles from abroad. It is yet to be covered by *Science Citation Index/ Journal Citation Reports (SCI/JCR)*. Its percentage of self citation is pretty low. All these points suggest that despite its long life the journal has failed to be an international journal. As it is not covered by SCI/JCR, its impact factor is not known. However, it can be surmised that its impact factor would be quite close to zero if not zero. Hence, it cannot be considered a journal of high quality. The sponsor has to work hard to improve its quality and raise its status in the international arena.

The journal can have a Web site too to attract international attention.

## REFERENCES

1. Chakravarthy (R) and Koley (B N). Development of physiological sciences in India. In *Emerging face of Indian Physiology: souvenir of FIPS conference, 1995/* edited by V.Mohan Kumar, Defence Institute of Physiology & Allied Sciences, New Delhi, 29-33.
2. Banerjee (S). *The days I left behind: an autobiography.* Calcutta: Haripada Chattapadhyay, 1999.
3. Dutta (B) and Sen (B K). *Indian Journal of Pure and Applied Physics: an analysis of citation pattern.* Paper presented at the 19<sup>th</sup> IASLIC Seminar, Bhopal, 13-16 November 2000.
4. Dutta (B); Sen (B K). *Indian Journal of Chemistry - Section A: an analysis of citation pattern.* Paper presented at the 19<sup>th</sup> IASLIC Seminar, Bhopal, 13-16 November 2000.
5. Dutta (B), Das (A K) and Sen (B K). A new indicator based on journal self citation. *CLIS Observer.* 2002; 19, 1-2; 2002; 110-19.