

between 8 and 18 including 4.32% of papers having IF above 17. And unlike Arunachalam's experience, such high impact journals are exclusively on well-known mainstream medical journals like *Journal of Clinical Investigation* (IF: 8.467) and *Lancet* (IF: 17.332). The rate at the base line would have been relatively better if all the *SCI*-indexed journals (not covered by *Index Medicus*, hence excluded) were included in the study.

In this context, it is worth mentioning that IF of a journal can be broadly explained as an estimation of average 'expected rate of citations' of articles published in that particular journal for a certain period of time. The IF of *Journal of Eukaryotic Microbiology* as per *JCR* 1994 was 2 which means that in average, each article published in that journal was expected to receive 2 citations. However this factor may vary as individual articles may obviously receive more or less citations according to the merit of the paper and several other factors. This is why the concept of 'Relative Citation Ratio' (RCR) came into being which is a ratio of 'Observed Citation Rate' (OCR) that is, the actual number of citations the article has received over a specific period of time and the 'Expected Citation Rate' (ECR) which is the IF of the journal in which the article has been published.

Likewise, the average quality of papers generated from a particular organization can also be broadly determined by estimating the 'Average Rate of Probable Citations' (ARPC) per paper. If the cumulative total of the product of the number of papers published in a particular journal and its IF is divided by total number of publications for a specific period then:  $ARPC = \sum NF/T$ , where  $N$  is the number of papers published in a journal;  $F$  is its IF and  $T$  is total number of papers. ( $\sum NF = N_1F_1 + N_2F_2 + N_3F_3 + \dots + N_nF_n$ .)

I have made such an estimate for our Institute for the 185 articles published during 1987–1994. Here the cumulative impact factor for 185 papers was 360.11. Dividing this number by 185, we get the value 1.946 (ARPC) of an article published from NICODE during the period. In a field where three-fourth of total publication output appear in journals having IF less than 1, the value 1.946 appears to be quite acceptable. I do not have any idea whether this indicator has already been conceived, evolved or worked out

and tested earlier by any information professional. However, I feel, this may be an useful tool of organizational assessment scientometrically.

To conclude, I should mention that the above analysis reveals that the publication output of NICODE is better than what was observed by Arunachalam and that his assessment has some obvious limitations as it under-represents the actual panorama of Indian medical research publication. In this context one question comes out naturally is 'how relevant is *Medline*-based study to assess medical research done in India'?

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**Note:** Incidentally, it was identified that the OCR for a fairly good number of publications from NICODE was much better than the ECR. As for example, according to *SCI* 1995, the paper by Bhattacharya, S. K. *et al.* published in *Journal of Infection* (1993, 27, 11–15) received 12 citations in 1995 (IF of *J. Infect* = 1.356). Another paper by Nair, G. B. *et al.* published in *Journal of Infectious Diseases* (1994, 169, 1029–1034) received 14 citations in 1995 (IF of *JID* = 4.781). We could not include the non-journal publications, but it appears that they also received citations; for example, the paper published by Nair, G. B. *et al.* in the 29th US–Japan Cholera Conference, 1993 (pp. 9–11) received a citation in 1995. These data were collected when I attended a workshop on Bibliometrics at INSDOC in February 1997.

#### **NICODE Publications 1987–1994: Fact Sheet**

##### *Publication coverage:*

Total no. of publications: 267.  
Non-journal publications: 33 (12.35%).  
Journal publications: 234 (74.64%).  
Indian: 90 (33.7%).  
Foreign: 144 (53.93%).

##### *Document coverage:*

Total no. of documents: 89.  
Non-journal documents: 10 (11.23%).

Journals: 79 (88.76%).  
Indian: 21 (23.59%).  
Foreign: 58 (65.17%).

##### *Publication (journal) coverage in databases*

##### *Index Medicus coverage:*

Total no. of publications: 185.  
Indian publications: 66 (35.67%).  
Foreign publications: 119 (64.32%).

##### *SCI coverage (out of above 185 publications):*

Total no. of publications: 123.  
Indian publications: 20.  
Foreign publications: 103.

##### *Impact Factor:*

Nil: 62 (33.51%).  
< 1: 34 (18.37%).  
1–2: 48 (25.94%).  
3–9: 33 (17.83%).  
> 17: 8 (4.32%).

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#### **Response:**

I thank Ray for reading my paper carefully and raising some interesting questions.

There are a few points on which Ray has got me wrong. (1) I did not say that 'no relevant research is being done by our medical scientists'. For example, in Table 8, you will see paediatrics is close to the top in my analysis of *Medline* data, and infancy diseases are a major health concern in India. (2) Has ICMR published 1007 papers or 185 papers, Ray wonders. Simple. All institutions under ICMR (including the headquarters in New Delhi) together have published 1007 papers. According to *Medline*, there were 185 papers with an address 'Indian Council of Medical Research'. Most of these papers are written by researchers working at ICMR headquarters. Some may be from other ICMR institutions, where the address line includes ICMR and not the name of the particular institution or the city.

Ray has raised a few questions on the methodology used. Should we include journal articles only or should we include conference papers, books, book chapters, internal reports, mimeographed lecture

notes, etc. also? I chose to restrict to journal articles for two reasons: most journals indexed in *Medline* are refereed. Besides, bulk of new research is reported in journals. In any case, such a large volume of papers (even if I have not included non-journal items) should lead to statistically valid conclusions regarding the thrust areas of research, which was what I was trying to find out from the *Medline* data.

Ray feels that my study does not cover Indian medical research 'comprehensively', and implies that I should have collected information from individual institutions (such as his own) instead of relying on an international database. Horses for courses, they say. It was not my intention to inventory all Indian publications – good, bad, indifferent, etc. – in medicine and related areas. I had a specific question to answer and *Medline*, I thought, eminently served the purpose. Besides, 'comprehensiveness' is such an elusive thing, you can never achieve it. What constitutes a 'research publication'? Can we count the articles that D. Balasubramanian writes in the science and technology pages of *The Hindu* (which, incidentally, fetched him the Kalinga Prize of the UNESCO) as research publications? Certainly, they are always well written, always explain some useful and often current developments in science, and are widely read. On the contrary, medical researchers and editors like Samiran Nundy would not mind if some of what is normally considered as research journals published from India are not indexed in *Medline* or *SCI*. For my part, I have clearly defined what part of the literature originating from India I am covering in my paper; I have mentioned *Medline* right in the title of my paper. Agreed that by making this choice,

I lose papers published in journals like *Current Science* and *Journal of Biosciences*. But one has to pay a price as long as one lives in the real world and not in an ideal world! Even the *Publishing Directory of ICMR Institutes* is not exhaustive, as Ray admits. So, what is the problem if *Medline* is not exhaustive?

That leads me to two points. (1) *Medline* is not stepmotherly to India and Indian journals. It does not cover many journals published in the USA, UK and Europe as well. The same is the case with *SCI*. Please read Gene Garfield's note on the alleged bias of *SCI* against third world journals [*Curr. Sci.*, 1977, 73, 639–641]. (2) What have we (librarians like Ray and scientists and researchers like those at NICED) done to remedy the situation? Have we written to editors and publishers of international databases like *SCI* and *Medline* requesting them to cover more Indian journals?

Ray finds that there is a discrepancy between my number based on *Medline* and his meticulously-counted number of NICED publications. He is surprised that his laboratory is not included in the list of the top 40 Indian institutions publishing medical research papers. My number for NICED is 102 (and this places NICED in the 45th place). During the period covered (database years 1987 Nov.–1994 Dec., and not journal cover date years as presumed by Ray), there were only 102 papers credited to NICED. Surely, I agree with Ray, *Medline* is not at all 'comprehensive' in its coverage. Among those 102, a sizeable number would have been published in journals having a cover date of 1986, 1985 or even earlier. And most papers published by NICED scientists in 1994 would have been covered in *Medline* in 1995 or 1996! Most data-

bases, unlike *Current Contents* and *SCI*, do take considerable time to index published literature.

Another point on which Ray has to be careful is that impact factor is not the same as number of citations received by a paper published in a journal. For a correct definition of impact factor (as used in *Journal Citation Reports*) he may refer to Garfield's book on citation indexing or a recent issue of *SCI Guide*. His point on 'observed', 'expected' and 'relative' citation rates is not relevant in the context of my paper. I have used them meaningfully in another paper on medical research in India based on an analysis of *SCI* data, which I presented at an international conference in River Forest, IL, USA, in 1955 (ref. 4 in my paper). A modified (and expanded) version is now under consideration for publication in a medical journal. What Ray calls ARPC is known and is being routinely used by INSDOC in evaluating CSIR laboratories.

To conclude, Ray is free to think that the performance of NICED is excellent. Such positive feelings, psychologists say, help one perform better. (I have not attempted to look at individual laboratories in my macroscopic study.) And I do not think that my study suffers from any more shortcomings than I have pointed out in my paper.

I thank Ray once again for his interest in my paper and his willingness to state his point of view without any reservation.

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## Ensuring global exposure

*Where journals abound, little fruit of knowledge is found.*

—Anon.

The recommendation of Eugene Garfield (*Curr. Sci.*, 1997, 73, 639–641) has come not a day sooner. However, with so many journals published by so many associations, societies and institutions, it may be impossible to compile local citation indexes and prepare a prioritized list of Indian journals. Instead, can we initiate and encourage printing of a journal in

India on the lines of *Nature* and *Science*, with rigorous norms, for publication of outstanding articles from India and other developing countries of the region?

I have always felt that *Current Science* adequately expanded to include all fields; physical, biological, geological and medical would be the ideal journal for this purpose. Suitable changes in the editorial policy with provision for quick submission, review and publication using electronic media must be made. A reasonable paper-handling charge (which can be

waived if the author issues a statement of lack of funds) should be levied to take care of the expenses.

I believe that this and this step alone will ensure the scientific articles from this part of world, a better exposure to the global scientific community.

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