

Status of Biomedical Research in India: An Analysis of Research output during 2002-2010

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Introduction

In India, health research is supported by several agencies both in public and private sectors, autonomous organizations, NGOs, as well as bilateral and multi-national agencies. Precise information about funding allocation for public health research by these agencies is difficult to obtain. In the absence of such information, we reviewed the disbursement of funds for extramural research by the Indian Council.

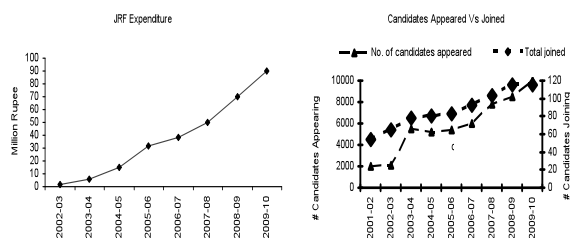


Figure 1: Disbursed Grants and Number of Candidates appeared vs. joined

Indian Council of Medical Research, an apex body in India for promotion of Medical Research started Financial Assistance to Junior Research Fellows (JRF) in 2001, with primary purpose of providing evidence base for policy making, practice guidance & programme development. This program forms a powerful instrument to arrive at a selection of funding priorities that takes into account National/International trends but also enhance linkages between spectrums of key stakeholders. Recruitment of JRFs is done annually through a National Level

exam. Selected fellows are allowed to join any Research Institute or universities or Medical College of their choice or any ICMR funded project

Objective and Methodology

The main objective of this research in-progress is to examine the current status of Biomedical Research in India, as reflected in the JRF Research output during 2002–2010, its growth, its strong and weak subject areas of research, its collaborative profile, quality of S&T output, and institutional productivity and quality.

The basic data available to us was the details of published papers by each fellow. A lot of value addition to this database was carried out to customize and analyse this information. Quality of Indian biomedical research has been studied by using journal impact factor and citations received per paper data. The count of scientific papers published in peer reviewed international journals provides an estimate of the volume of research activity and related knowledge production. The citations to these papers provide an idea about the transfer and utilization of this knowledge. In citations analysis, the basic assumption is that a frequently cited paper has greater probability to influence subsequent research activities than a paper with no citations or few citations. Thus, a set of papers with different citations can be compared in terms of visibility and impact on the scientific community.

Observation and Key findings

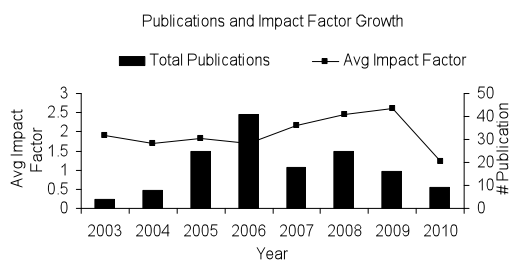


Figure 2. Total Publications each year by second JRF batch of 2002

The impact of the publications output by India in Biomedical research has been studied on two indicators: (i) average impact factor per paper, which is based on the impact factor of journals publishing research output, and (ii) average citations per paper, which is computed on cumulative citations received by research papers upon publication in journals till Jan 2010

The total number of publication by the first JRF Batch 2001 was 140 papers in total. A total of 146 papers were published by the second 2002 batch of 65 research fellows, giving a 4% increase in publication growth rate. The above graph shows the total publication by the second JRF batch of 2002 by each year. The number of publications along with Average Impact Factor increases steadily from 2003 to year 2006. After 2006, the total publications decrease till 2010. The average IF per paper for the overall publications output by 2002 batch was 1.98. Comparing the IF per paper on annual basis, it varied between 1.22 and 2.62 during the eight years period from 2003 to 2010, the highest being in 7th year at 2.62 in 2009

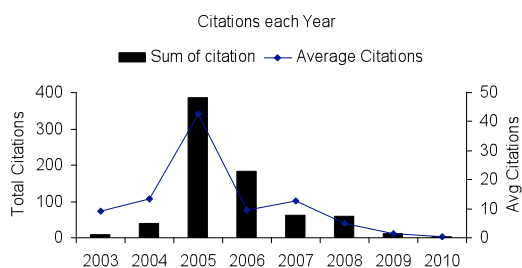


Figure 3. Total and Average Citations per year

Citation data was available for 63 research papers. On an overall level the Average citation per paper was 12. Research papers were found to reach their citations peak in 3 years of their publication in journals. 46% of the research output was published in low impact journals (IF between 0.001 and 1.999), 45% in medium impact journals (IF between 2.0–3.999), and 10% in high impact journals (IF 4.0 and above). Besides, 12% output was published in zero impact journals.

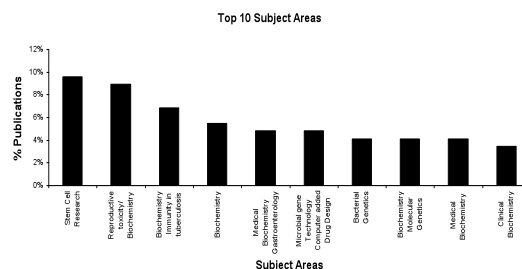


Figure 4. Top areas chosen for biomedical research

Publications output by India during 2003–2010 was the highest in Stem Cell Research (10%), followed by Reproductive toxicity/ Biochemistry (9%), Biochemistry Immunity in tuberculosis (7%)

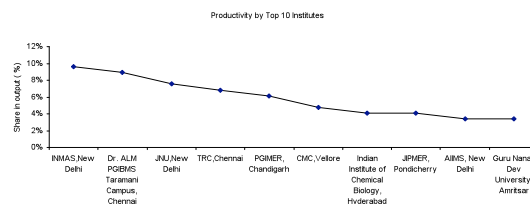


Figure 5. Productivity curve of top 10 institutions

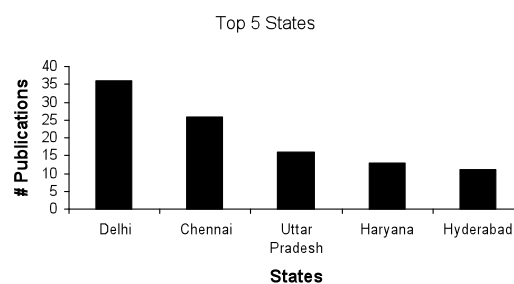


Figure 6. Top 5 states in terms of productivity

In all, 36 institutions participated in the research carried out by 2002 JRF batch.

Bulk of the contribution (59%) came from few select institutions (10 institutes). State-wise analysis shows that Delhi and Chennai account for 43% of the research publications followed by Uttar Pradesh accounting for 11% of the total research output

Observation and Key findings

For enhancing quantity and quality of research output, there is a need to develop goal-oriented and need-based programs at the national and institutional level. There is also need to change the methods of deciding priorities for allocation of funds, particularly in the extra-mural funding given by research agencies, and also change the system of awarding research contracts, so as to ensure focused funding in certain areas impacting overall disease burden of India. Efforts must be made to encourage institutions to publish in relatively higher impact factor journals.

Conclusion

For enhancing quantity and quality of research output, there is a need to develop goal-oriented and need-based programs at the national and institutional level. There is also need to change the methods of deciding priorities for allocation of funds, particularly in the extra-mural funding given by research agencies, and also change the system of awarding research contracts, so as to ensure focused funding in certain areas impacting overall disease burden of India. Efforts must be made to encourage institutions to publish in relatively higher impact factor journals.

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