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Original article

Analysis of hematology research publication in India: An assessment using a web based portal

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ABSTRACT

Objective: India is witnessing an increase in the numbers of its medical graduates and scientific publications. This growth is resulting in increased academics, specialists and generalists. It has been reported that there is an increase in the medical publication possibly reflective of this growth. Clinical Hematology which is a good example of successful bench to bedside medicine translation; is a rapidly growing novel subspecialty. With a proposal that the growth of a specialty is reflected by an increase in its scientific publications; we performed an estimate of publications in this subspecialty to establish the present situation; and the potential for improvement in this discipline.

Methods: We performed a bibliographic analysis of citable document from 1996 through 2015 in hematology using the user-friendly graphical interface, web-based portal of SCImago.

Results: Hematology contributed to 6.5% of the medical literature published from India. Indian contribution was 2.74% of global publications. China and Japan were the two leading countries in the Asian region in publications on medical research.

Conclusion: Our analysis did not reflect an anticipated growth in publications. Indian contribution towards medicine and specialty (Hematology) publications needs remedial measures and suggestions for improvement.

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1. Introduction

Indian medical schools graduate the highest number of doctors [1]. The magnitude of the population coupled with infrastructure provides for the enormity of our patient numbers [2].

There is a trend to subspecialisation amongst our medical graduates patterned on global behavior [3,4]. The explosion of new knowledge secondary to the rise and productivity in biomedical research; with the array of technology derived from those advances, has fueled the increasing number of specialties and specialists [5].

Clinical haematology is a rapidly growing subspecialty in the discipline of medicine. The position at the interface of laboratory and clinical medicine is a unique aspect of this fascinating specialty [6]. An upcoming specialty is expected to witness an exponential growth in publications [7]. It has been reported (in other

disciplines) that the growth of scientific publications from India is on the rise [8].

We therefore attempted to estimate the publication pattern and analyze the trend in the specialty of clinical hematology.

2. Materials and methods

The data for the present study was extracted from the user-friendly graphical user interface, web-based portal of SCImago [9]. The papers included in the present study were collected from Scopus (officially Sciverse Scopus). Scopus, owned by Elsevier, is a bibliographic database, containing abstracts and citations for academic journal articles. For retrieval of the relevant information, the search terms "Medicine" was chosen in the subject area, "Hematology" in the subject category and "Asiatic" in region. All countries were ranked according to numbers of citable documents. The period studied was 1996 to 2012. The interval between 2013 through 2015 was additionally studied to analyze the world trend.

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2.1. H index

This is an author-level metric aiming to measure both the productivity and citation impact of the publications of a scientist or scholar. The index is based on the set of the authors' most cited papers and the number of citations that they have received in other publications.

2.2. World Report

The world report is a feature available in SCImago which offers detailed information for the analysis of the world according to geographic regions. The report shows the evolution during the period 1996 through 2015 of Cited and Uncited Documents [10]. We generated the report of country (India) and region (Asiatic) for our analyses.

2.3. Statistics

Basic descriptive statistics were used to report the observations.

3. Results

A total of 11334808 documents were published in medicine during this period. Of these 9746161 (85.98%) were citable documents.

3.1. World report: medicine

India ranked 18th when arranged according to number of citable publications in the discipline of medicine, contributing around 3000 articles as opposed to >60,000 articles from the United States in the same period (Fig. 1a). Japan and China were the only other regions who contributed more towards the global pool from Asia and they were ranked sixth and ninth respectively. The global and Asian distribution is depicted in the bubble charts of Fig. 1b and c.

3.2. Asian and Indian report: hematology

We then analyzed publication output in the discipline of hematology using hematology as the key word within medicine. Indian contributions towards global hematology citable literature was 2.74%. This related to a contribution of 14.8% when compared amongst the Asiatic region (Fig. 2a). Hematology contributed to 6.5% of the medical literature published from India (Fig. 2b)

3.3. Time trend over years: global, regional and Indian

We then plotted the trend in hematology research publication year wise from 1996 through 2012. We compared it also by region (Europe, North America and Asia). We observed that there is a trend towards increasing number of publications in hematology globally (Fig. 3a). We then analyzed it by individual countries comparing India with USA (global leader) and China and Japan, which were the other two dominant countries in the Asiatic region with medical research. Chinese research continued to show the increasing trend though we observed an apparent plateau in the trends of Japan and India (Fig. 3b).

4. Discussion

This analysis conflicts with and does not reflect the recently reported improving trends in publication behavior seen in other disciplines in India [8]. Despite the reported growth seen in the field of hematology; the contribution towards medical

publications from India has remained steady from 1996 through 2012 (Fig. 2).

When compared across regions, researchers from Western Europe and Northern America respectively continued to publish twice the number to researchers from Asia. The wide gulf between these regions and Asia is demonstrably maintained for the period studied (Fig. 3).

Medical schools in India produce the largest number of doctors than anywhere else in the world; (30,408 from 271 medical schools) [1]. There is a plan to further increase the number of graduates from medical schools in India over the next ten years [11]. India is also home to the world's largest medical emigrant community [12]. A workforce equivalent to 10.1% of physicians registered at the Medical Council of India work in the United States, the United Kingdom, Canada, and Australia [13]. By magnitude of patients and doctors, the seeds for research should not be a problem. However, our results expose a disconnect between expected numbers and reality. The further analysis amongst countries in Asia too highlighted a larger contribution of publications from China (6% in global and 32.5% in Asian medical literature) in comparison to Indian research.

This analysis could serve as the seed to introspect and expand the capabilities required to power research and growth of subspecialties. We postulate a few reasons for these differences in India. Firstly, there is a deficit of protected time for research in medical institutes in India as opposed to the west. This is recognized as a vital tool for nurture of research [14]. With continuing medical emigration and the rising patient numbers, the burden on available medical personnel is overwhelming, potentially limiting research. Secondly, a culture of research and mentorship is yet to be adopted in India. Higher education in India suffers from several systemic deficiencies and the need for a research based education has long been highlighted and argued [15–17]. Inculcating a culture of research during formative years might be useful to improve science. Even though not reflected in this analyses; the growing number of Nobel laureates in Japan, China, Germany and USA in the field of physics, medicine and chemistry might be related to this culture of research which might also account for the regional differences seen within Asia [18]. It will be insightful to estimate the number of publications from Indian medical emigrants; to generate other associations and hypothesis that could serve as guides for our policy and curriculum planners.

Lastly, infrastructure and capital investment related to our developing economy might also have a role for the observed pattern, which will need a systematic and rigorous assessment.

In conclusion, Indian contribution towards scientific literature is improving but requires additional measures to realize the potential. The publication of scientific activity fuels interest in upcoming researcher – clinicians. These results should alert our policy makers and curriculum planners and combine efforts with the medical community to improve practices. With rapid expansion of technology and discovery of disease mechanisms, the need for establishment of frameworks, collaborations, mentorship and infrastructure should be recognized to fuel the growth of subspecialties.

5. Study limitations

The methodology of this search is not an absolute estimation since the distinction between areas of subspecialties in medicine is obscured by a high degree of overlap (eg. Haematology and Oncology). Secondly, the comparisons generated are based only on numbers and therefore might not truly reflect the significance of contributions (comparisons based on impact factors of journals might help in a better assessment). Also, the comparator portal

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