

Comparison of Research Productivity Between Metro and Non-Metro Cities in a Biomedical Journal from India

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Abstract

Background: The research productivity of a place depends on doctors, patients and available infrastructure to carry research activities. **Aims:** We aimed to study the publishing trends and research productivity of metro and non-metro cities in the Journal of the Association of Physicians of India (JAPI). **Materials and Methods:** Bibliometric analysis of research articles published in JAPI between 2000 and 2011 was undertaken. The four types of articles (original articles including brief reports, case reports, correspondence and pictorial image) were studied for research productivity. They were analyzed according to subspecialty, publication times and type of research work from both places. Comparison between groups was done using Fisher exact and Mann-Whitney U test. Descriptive statistics were used and a $P < 0.05$ was considered significant. **Results:** Of a total of 2977 articles, 1798 were available for analysis. Metros published 46% (825/1798) and non-metros 54% (973/1798). Original articles and case reports constituted 3/4th of the published literature from both places. Pictorial images were seen more from non-metro cities ($P = 0.03$). Mumbai and Delhi were leading from the metros, whereas Varanasi and Chandigarh were leading from the non-metro places. Endocrinology, Neurology, Cardiology and Infectious Diseases constituted the top four subspecialties from both places. Neurology articles were published more from non-metros ($P = 0.03$). The timelines from submission to publication varied between 12 and 15 months, and were lesser for articles from the metros ($P = 0.01$). **Conclusions:** Metros and non-metro cities are comparable in publishing trends and research productivity. Places with post-graduate institutes contribute majority of the research articles. Faster publication timelines from metros indicate better manuscript content and preparation.

Keywords: India, Metros, Non-metro cities, Publication trends, Research productivity

Introduction

Research activities are the essence of academic institutes and doctors involved in medical practice. The research productivity of any place or institute is determined by various factors like availability of patients, doctors keen to carry out the research and better infrastructure facilities to carry out the proposed research project.^[1,2] Research productivity from India is far

behind when compared with the developed world based on the above factors.^[3,4] However, the scenario is changing now, with an increasing number of publications from the Indian subcontinent in most of the national and international journals.^[5,6] Academic institutes and hospitals involved in teaching and training are actively carrying out research projects at their departments. The need and importance of publishing the academic material is picking up in India for the past decade.^[7] Explosive growth of general medicine in the last century lead to branching of medicine into subspecialties like endocrinology, rheumatology, etc.

Metro cities are better equipped with old academic institutes and infrastructure facilities to carry out research activities at their places when compared with smaller cities and towns. On the contrary, the facilities in the government-run institutions

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may lag behind the world class research facilities that exist in a corporate lab. The research activity from the medical colleges, post-graduate institutes and corporate hospitals finds its way into the popular journals published from India. The Journal of Association of Physicians of India (JAPI) is the flagship journal of the Association of Physicians of India (API). API was formed in 1944 and has over 15,000 participants as its members.^[8] JAPI is published every month, with a readership of over 250,000, and is extremely popular among the medical fraternity. The journal is published every month in print and online, and covers all the aspects of medicine, including subspecialty subjects. JAPI attracts manuscripts from the length and breadth of the country and reflects the research productivity of the physician community in India. We carried out this work with the aim to analyze the research productivity and publishing trends from the metro and non-metro cities in the JAPI journal.

Materials and Methods

JAPI issues of last 12 years (Jan 2000 to Dec 2011) were taken for analyzing the research productivity of metro and non-metro cities in the journal. The data were derived from the website of the journal, which gives a link to previous issues.^[9] The articles published were analyzed for types of articles and the subspecialty or department from where the work originated. The definition of metro is based on the total population living in the city (more than 4 million as per Indian census). For the purpose of this article, we considered Delhi, Mumbai, Kolkata and Chennai as metro cities and all others as non-metro cities.

Research work carried out by the individuals and institutions is published as original articles. However, the same data is published as correspondence (also known as Letters to Editor) occasionally due to space constraints. Case reports and reporting an interesting image are also the early steps of research interests of individuals. Hence, the following types of articles were included to assess the research productivity: Original articles, Case reports, Images and Letters to Editor. The following articles were excluded from the analysis as they do not report data pertaining to original research: Editorials, Update articles, Review articles, Philately, Miscellaneous articles, Postgraduate Clinic, Guidelines, Announcements and Corrigendum. Correspondence pertaining to the published articles and comments unrelated to research work were also excluded from the analysis. Articles published in special issues and topic supplements were excluded.

The duration between initial submission and revision, time taken for acceptance and publication is counted using the dates given in the article files. The 1st day of every month is taken as the date of publication of all articles given in that issue (e.g., 1 Sep 2010 is taken as the date of publication for the articles in the September 2010 issue). The institution of the first author is taken as the place and department of study for the

articles involving multiple authors from different institutes and departments. The data were obtained independently by both the authors and discrepancy, if any, was resolved by accessing the information jointly from the JAPI website. The details of the study are given in a flow diagram in Figure 1. The study data were available on the website of the journal and hence this bibliographic analysis does not require permission of a local ethics committee.

Statistical analysis

Summary data are presented as mean (SD) and comparison between groups was done using the Mann-Whitney U test. The data regarding the timelines are derived from the articles and days were calculated using DAYS360 formulas embedded in Microsoft Excel (Microsoft Corporation, Redmond, WA, USA). Fisher's exact test was used to compare the frequency of variables among the two groups. *P* values were reported for all statistical tests, and a value < 0.05 was considered to be significant.

Results

Over the past 12 years, JAPI published 12 volumes (volume numbers 48-59), comprising a total of 144 issues. Ten issues were not considered as they published the proceedings of the API conference abstracts, and the details about the May 2005 issue were not available on the website. A total of 2977 articles were published in the JAPI during the last decade. Of a total of 2977 articles, a total of 1798 articles were eligible for the final analysis, as shown in Figure 1. Metro cities contributed 825 (46%) and non-metros 973 (54%) of the total articles. The year-wise contributions from both the places show a consistent declining trend over the past decade, as shown in Figure 2. Non-metro cities contributed a relatively higher percentage of articles in the years 2007 and 2011. Mumbai and Delhi are the leaders from metros, whereas Varanasi and Chandigarh lead from non-metro places.

Table 1 gives a comparative percentage analysis between metro and non-metro cities regarding the research productivity. Overall, the case reports are the most common type of published literature, closely followed by original articles from both metro and non-metro cities. Original articles are published more from the metros, although the difference is not statistically significant (*P* = 0.05). The contribution as pictorial images is published more from the non-metro cities (*P* = 0.03).

Table 1: Types of articles from metro and non-metro cities

Type of article	Metros n=825 N (%)	Non-metros n=973 N (%)	<i>P</i>
Original articles	315 (38.2)*	329 (33.8)	0.05
Case reports	330 (40)	373 (38.3)	0.49
Correspondence	102 (12.4)	147 (15.1)	0.10
Pictorial images	78 (9.5)	124 (12.7)	0.03

*Mean (SD)

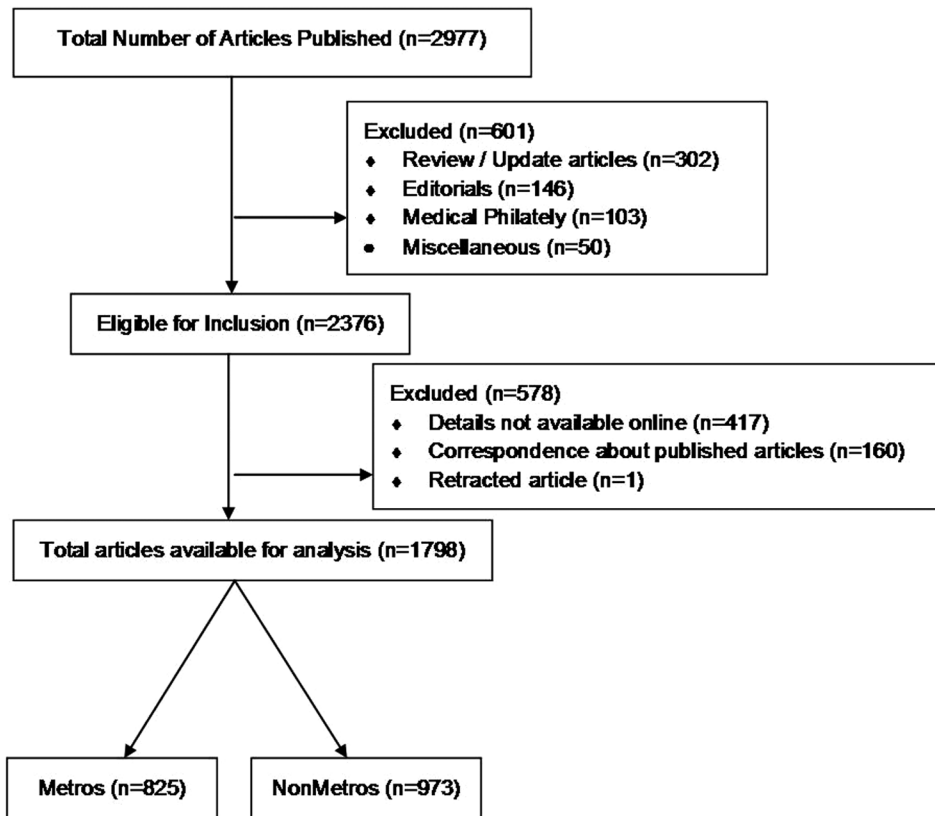


Figure 1: Flow diagram of the study

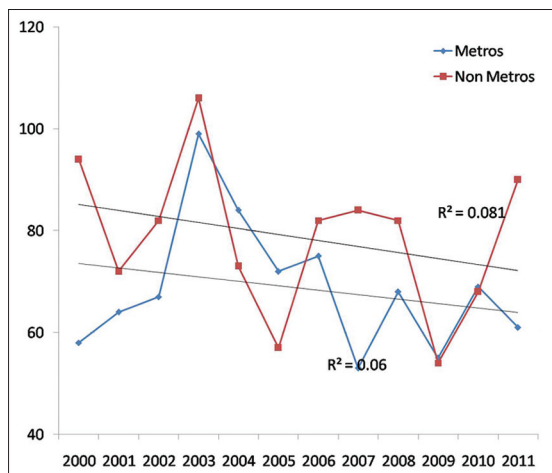


Figure 2: Publication trends over the last decade from metros and non-metros

The division among various specialties between metro and non-metro cities is given in Table 2. Endocrinology leads the pack, followed closely by Neurology, Infectious diseases and Cardiology. Articles from Neurology and miscellaneous groups were published more from the non-metro cities. Rheumatology and Gastroenterology articles were published more from the metros in comparison with the non-metros ($P < 0.05$).

Details about the timelines between submission and publication

Table 2: Specialty-wise comparison of research productivity

Specialty	Metros <i>n</i> =825 <i>N</i> (%)	Non-metros <i>n</i> =973 <i>N</i> (%)	<i>P</i>
Endocrinology	150 (18.2)	162 (16.6)	0.41
Neurology	101 (12.2)	155 (15.9)	0.03
Infectious diseases	106 (12.8)	150 (15.4)	0.13
Cardiology	95 (11.5)	120 (12.3)	0.61
Rheumatology	66 (8)	51 (5.2)	0.02
Oncology	63 (7.6)	52 (5.3)	0.05
Gastroenterology	61 (7.4)	37 (3.8)	0.01
Nephrology	50 (6.1)	40 (4.1)	0.06
Hematology	30 (3.6)	42 (4.3)	0.47
Miscellaneous	103 (12.5)	164 (16.9)	0.09

are given in Table 3. The number of articles revised before publication was similar from metros and non-metros (63% (516/825) and 67% (649/973), respectively). Of the total articles sent for revision, 21% (250/1165) of the articles were rerevised. The number of articles sent for rerevision was same between both metros and non-metros ($P = 0.88$). The time taken from initial submission to acceptance varied between 8 and 9 months, and this was a month less in cases of articles from metro cities ($P = 0.01$). There was another 4 to 5 months time gap for publication after acceptance, which was not different between both the groups. The total time taken by the articles from submission to publication is about 12-15 months, and is shorter in articles from metros ($P = 0.01$).

Table 3: Comparison of publication timelines between cities

		Metros n=825	Non-metros n=973	P
Articles sent for revision	N (%)	516 (62.5)	649 (66.7)	0.06
Articles sent for rerevision	N (%)	109/516 (21.1)	141/649 (21.7)	0.88
Time from submission to acceptance	Days*	246.3 (214.6)	269.3 (232.4)	0.01
Time from acceptance to publication	Days*	133.4 (123.3)	145.8 (128.3)	0.06
Time from submission to publication	Days*	379.7 (230.5)	414.5 (234.5)	0.01

*Mean (SD)

Discussion

Our study analyzed the research productivity and publishing trends of physicians from metro and non-metro cities in one of the most popular journals of India, i.e., the JAPI. Metro and non-metro cities contribute equally in the published research articles in the JAPI. Equal contributions from both places indicate that the physicians working in non-metro places are actively participating in research activities. The other reason could be due to the presence of post-graduate teaching institutes in places other than metro cities. The contributions in the JAPI from both the groups remained the same over the last decade. The trends remain in the same direction over the last decade, except for 2007 and 2011, in which non-metros published more articles.

Original articles are considered as the essence of research activity.^[10] This is followed by short case series and case reports. The contributions from metros and non-metros did not differ in the type of research productivity. Original articles were published more from the metros than from the non-metro cities, indicating better research output of metros. Pictorial images were published more from the non-metro cities, indicating a wide variety of cases across the country. Mumbai and Delhi contribute a greater share of articles in the metros, in tune with their status intact as the economical and political capitals of India, respectively.^[11] Varanasi and Chandigarh contributed majority of the articles from non-metro cities. This could be explained by the fact that two premier institutes imparting post-graduate medical teaching (Post Graduate Institute and Banaras Hindu University) are located in these two places.

The clinical practice of general medicine involves cardiovascular disorders, infections, diabetes and thyroid disorders commonly. The research productivity of both places also reflects a similar trend in the articles. India has the dubious distinction of being the diabetes capital of the world, and majority of the research articles pertain to the field of diabetes.^[12] The articles in the field of Neurology were published more from non-metros. The same findings were observed in a recent research paper that analyzed the publications of Indian Neurosciences.^[13] This could be due to the presence of premier neurology institutes out of metros in

Bangalore, Ranchi, etc., Gastroenterology and Rheumatology articles were published more from metros probably, due to presence of active teaching departments and lack of spread of these specialties into the interiors of the country. More number of articles from non-metros was subjected for revision before acceptance. This could be explained by the fact that physicians from metros are more aware about the research activities and publishing procedures, leading to fewer revisions.

The articles take an average time of more than 1 year from the date of submission to publication. The time taken by articles from metros is less when compared with non-metro cities. The average time from submission to acceptance and publication is 1 month less for metro cities. This delay could be due to the requirement of submitting print copies of manuscript, delay in peer review process and lack of online early publication with JAPI.^[14] Online manuscript submission and prompt peer review could lead to the rapid growth of JAPI in comparison with other biomedical journals from India.^[15] The faster timelines regarding peer review process and early publication of the accepted manuscripts are two essential requirements of a good journal. These attributes alone attract lot of good research articles from the authors. Although we analyzed all the online available data in this study, exclusion of some articles for lack of details remain a major limitation of our study.

To conclude, our analysis showed that the metros and non-metro cities were comparable in publishing trends and research productivity. Mumbai and Delhi contributed majority of articles from metros and Varanasi and Chandigarh from non-metro cities. Original articles and case reports were seen in equal numbers, whereas images were published more from non-metros. Articles from metros had faster pre-publication timelines, indicating better manuscript content and preparation.

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