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10 Year Publication Trends in Dermatology in Mainland China

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Abstract

Background—China has been experiencing huge changes in all aspects including dermatologic research since its reform in 1978. However, how the economic and intellectual development has influenced the publication trends in the field of dermatology, which could mirror the scientific development in other medical disciplines, is unknown. In the present study, we analyzed the publication trends from departments of dermatology in mainland China from 2002 to 2011.

Materials and Methods—All publication data were obtained from www.pubmed.com. Only papers published from dermatology departments of mainland China were used for analysis.

Results—The number of publications increased 10-fold over this 10 year period. A total 1,231 of articles were published in English in 251 journals between 2002 and 2011. A total of 129 journals published only one paper from dermatology departments of mainland China. Over 60% of articles were original research and 21.7% were case reports. Among these 251 journals, foremost was the Journal of Clinical Experimental Dermatology, which published 5.9% of all papers from mainland China. 2.7% papers were published in the Journal of Investigative Dermatology. The number of publications positively correlated with the changes in gross domestic product per capita during the study period.

Conclusions—These results suggest that the number of publications in the dermatology field has increased markedly in mainland China over the last 10 years. This dramatic increase in publications could be, at least partially, attributed to the significant improvement in economic conditions in mainland China.

Keywords

Publication; Dermatology; Gross Domestic Product; China

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INTRODUCTION

China is a developing country. Since its reform and opening in late 20th century, China has been experiencing remarkable changes in all aspects of its society including its economy and scientific research. The average annual rate of economic growth in the mainland China has been 9.9% for the last 30 years¹. Availability of research funding is one of the key determinants for the success of research^{2,3}. Publications often serve as a parameter for measuring the productivity of research, while citation counts are useful for evaluating the quality of publications and H index, for assessing the success of researchers³⁻⁵. By 2006, mainland China was number three in the number of publications worldwide, while the US and Europe were first and second, respectively (<http://conversableeconomist.blogspot.com/2012/01/us-science-needs-to-look-beyond-our.html>, Obtained on Oct. 6, 2012). In 2008, China became number one in the number of publications in the engineering field (<http://www.scidev.net/en/news/china-tops-engineering-publications-list.html>, Obtained on Oct. 6, 2012), 10.2% of all articles published in international science magazines were from China, which made mainland China number two in the world (<http://phys.org/news/2011-03-china-rockets-science.html>, Obtained on Oct. 6, 2012). The number of publications in the biotech field increased at an average annual rate of 13.6% from 2006 to 2010 in China⁶. Regarding the number of publications in the biotech field, China remained in second place in the world in both 2009 and 2010⁶. Mainland China has about 15,000 dermatologists (www.eadv.org/fileadmin/content/download/doc_72727F9c.pdf, Obtained on Oct. 16, 2012), but prior data related to their publications is not available. Thus, in the present study, 10 year publication trends in mainland China were analyzed for the field of dermatology.

Materials and Methods

For publication searches, the internet address, <http://www.ncbi.nlm.nih.gov/pubmed>, was used to search articles in English from January 1, 2002 to December 31, 2011. The terms used to search each type of articles were listed in Table 1. Online Epub (ahead online electronically, but not yet printed) articles and papers published by authors from Taiwan, Hong Kong and Macau were excluded. Thus, only articles from dermatology departments of mainland China will be included in this study. Since the number of published papers is usually proportional to data for gross domestic product per capita (GDPPC), GDPPC for mainland China from 2001 to 2010 also were obtained from <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>. (Obtained on Oct. 1, 2012).

There were some limitations in this study. For example, if either China and/or dermatology were not listed as the authors' affiliations in papers, they would not be disclosed by the search terms in the present study.

Statistics

GraphPad Prism 4 software (San Diego, CA, USA) was used for all statistical analyses. Two-tailed nonparametric correlation and linear regression were used to determine significance.

Results

Number of Publications Rose Linearly from 2002 to 2011

A total of 1231 articles from dermatology in mainland China were published in 251 journals. There was a 10-fold increase in the total number of articles published over the last 10 years (Fig. 1, Table 2). On average each journal published 4.90 articles. There were 129 journals that published only one article from mainland China over the last 10 years. But 10 journals accepted over 41% (511 articles) of all published articles (Table 3). The Journal of Clinical Dermatology and Chinese Medical Journal (Engl) published the largest portion (5.9% for each journal) of papers from mainland China, followed by International Journal of Dermatology that published 5.8%. During this period, the Journal of Investigative Dermatology published 33 articles from mainland China, with 25 of these 33 articles from top five institutions. These five institutions published 385 papers, totaling over 31% of the publications from mainland China (Table 4).

The Quality of Publications Steadily Improved from 2002 to 2011

Sometimes an increasing number of publications can sacrifice quality. Therefore, we next assessed whether the quality of publications in mainland China also improved over this time frame. Since it is generally accepted that high quality papers are published in journals with higher impact factors, we used the journal's impact factor to determine the quality of publications. As seen in Fig 2, the average impact factor per paper increased significantly over the period, suggesting an overall improvement in quality.

Number of Publications Correlated Positively with GDPPC

It has been shown that economic conditions influence publication quality and quantity⁷. We next determined whether the increased publications were associated with changes in GDPPC. As seen in Figure 3, GDPPC of mainland China increased linearly from 2001 to 2010 (Fig 3a). The number of publications positively correlated with the GDPPC (Fig 3b). These results suggest a significant impact for the improving Chinese economy on dermatologic research.

Discussion

It has been reported that the number of publications in dermatology has been increasing year by year^{8,9}. In the present study, we demonstrate that there also has been a dramatic increase in the number of publications in dermatology in mainland China. The dramatic increase in publication in mainland China could be partially attributable to its rapidly economic growth. It has been shown that publications are proportional to gross domestic growth⁷. In agreement with previous finding¹⁰, the present studies also revealed that GDPPC is one of the key factors influencing publications. With the increase in GDPPC, government has had sufficient funds to support research. National Natural Science Foundation of China is the main organization supporting research in mainland China. From 2001 to 2010, funding for life science increased from 0.27 to 1.7 billion yuan RMB (www.nsfc.gov.cn. Obtained on Oct. 1, 2012). Thus, the remarkable increase in publications is likely an economically driven phenomenon reflecting the rapid economic development in mainland China. In contrast, the

annual growth rates of dermatological publications in mainland China were far more than the annual growth rates in dermatology in Economic Co-operation and Development countries (increased 50% in 10 years)⁹ and other fields (2.2-9.9%)¹¹ in other regions of the world.

Manpower is another determinant affecting the number of publications¹². In recent years more and more Chinese scientists trained in Western countries have returned to mainland China. In addition, graduate students perform most of the laboratory research in mainland China. From 2001 to 2010, the number of graduate students increased from 133,000 to 474,000 (http://kaoyan.eol.cn/kaoyan_news_3989/20090111/t20090111_354041.shtml Obtained on Sept. 26, 2012). Although not all of these students are in dermatologic fields, it is likely that the increase of students in dermatology research is proportional to the overall increase in number of graduate students, which would definitely facilitate accomplishment of additional research. In particular, some graduate programs require students to publish at least one paper in a SCI journal in order to obtain their graduate degree. Moreover, the increased number of well-trained research personnel, complied with efforts to improve English proficiency likely enhanced research productivity and writing skills, a potential barrier for non-English speaking people attempting to publish papers in English language journals.

The other major factor that could be driving publication growth is academic promotion requirements in mainland China. Without publications in SCI journals it is increasingly difficult for academic appointees to be promoted. In addition, without continuously publishing papers in SCI journals, senior researchers can lose their higher academic positions. Thus, both junior and senior researchers must publish more papers in order both to reach and sustain their academic careers.

Over 40% of papers from dermatology departments in mainland China were published in 10 journals, but papers were published in many more journals, which may reflect both the large number of dermatologists and the broader range of research interests in mainland China. Though 1231 papers published over 10 years reflects a huge increase in scientific productivity in mainland China, this number still does not match the research productivity of dermatology departments in well developed countries such as United States of America, which published over 10,000 papers during the same period. Nevertheless, the increase in both the quantity and quality of publications in mainland China should continue to grow because of the larger number of research dermatologists and continuation of economic growth in mainland China.

In summary, the present study shows that in mainland China, the publications in dermatology had been steadily increased from 2002 to 2011. This increase in publication reflects the rapid economic growth in mainland China, suggesting the importance of economy in scientific research.

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Figure 1. Number of Publications Increased Linearly from 2002 to 2011

Publication data were collected as described in materials and methods section. Linear regression was used to analyze the significance. ($r^2=0.9138$, $p<0.0001$)

Figure 2. The Quality of Publications Improves significantly over the Study Period

Publication data were collected as described in materials and methods section. The impact factor per paper was calculated by dividing total impact factor by total number of published papers in each year. Linear regression was used to analyze the significance. ($r^2=0.8983$, $p<0.0001$)

Figure 3. Correlation of GDPPC with Publications

a exhibits the GDPPC in each year from 2002 to 2011. b displays the correlation of number of publications with GDPPC. Two-tailed Pearson test was used to determine significance. ($r=0.9817$, $p<0.0001$)

Table 1

Search Terms Used in the Study

Types of Articles Searched	Search Terms
All types of Articles	Dermatology, China
Review	Review, Dermatology, China
Case Report	Case Report, Dermatology, China
Clinical Trial	Clinical Trial , Dermatology, China
Randomized Trial	Randomized Trial, Dermatology, China
Meta-Analysis	Meta-Analysis, Dermatology, China
Letter	Letter, Dermatology, China

Table 2

Number of Publications in Each Year

Year	Review (% of Total)	Case Report (% of Total)	Clinical Trial (% of Total)	Randomized Trial (% of Total)	Meta-Analysis (% of Total)	Letter (% of Total)	Original Research (% of Total)	Total
2002	0	2 (8.0%)	0	1 (4.0%)	0	0	22 (88.0%)	25
2003	2 (4.8%)	13 (31.0%)	0	1 (2.4%)	0	0	26 (61.9%)	42
2004	2 (2.7%)	19 (26.0%)	0	1 (1.4%)	0	0	51 (69.9%)	73
2005	6 (6.3%)	19 (19.8%)	1 (1.0%)	0	0	0	70 (72.9%)	96
2006	5 (6.1%)	24 (29.3%)	3 (3.7%)	3 (3.7%)	1 (1.2%)	0	46 (56.1%)	82
2007	2 (2.0%)	23 (23.2%)	3 (3.0%)	2 (2.0%)	2 (2.0%)	0	67 (67.7%)	99
2008	6 (4.5%)	26 (19.40%)	2 (1.5%)	2 (1.5%)	0	1 (0.7%)	97 (72.4%)	134
2009	11 (6.2%)	38 (21.3%)	8 (4.5%)	3 (1.7%)	1 (0.6%)	2 (1.1%)	115 (64.6%)	178
2010	9 (3.8%)	58 (24.7%)	9 (3.8%)	6 (2.6%)	1 (0.4%)	2 (0.9%)	150 (63.8%)	235
2011	11 (4.1%)	44 (16.5%)	11 (4.1%)	10 (3.7%)	8 (3.0%)	0	183 (68.5%)	267
Total	54 (4.4%)	266 (21.6%)	37 (3.0%)	29 (2.4%)	13 (1.1%)	5 (0.4%)	827 (67.2%)	1231

Table 3

Leading Journals for Chinese Authors from 2002 to 2011

Journals	Number of Papers	% of Total Papers
1. Clin Exp Dermatol	73	5.9%
2. Chin Med J (Engl).	72	5.8%
3. Int J Dermatol.	71	5.7%
4. Br J Dermatol.	55	4.5%
5. J Huazhong Univ Sci Technolog Med Sci.	55	4.5%
6. Arch Dermatol Res.	52	4.2%
7. J Eur Acad Dermatol Venereol.	34	2.8%
8. Mycopathologia.	34	2.8%
9. J Invest Dermatol.	33	2.6%
10. J Dermatol Sci.	32	2.6%
Total	511	41.5%

Table 4

Top Five Journals for Each of Top Five Institutes in Mainland China

Rank	Total Publications	Journals	Publications (%)
1	110	J Invest Dermatol.	15 (13.6%)
		Arch Dermatol Res	11 (10.0%)
		Br J Dermatol.	10 (9.1%)
		J Eur Acad Dermatol Venereol.	10 (9.1%)
		Clin Exp Dermatol.	8 (7.3%)
		Other 33 Journals	56 (50.9%)
2	92	Chin Med Sci J	7 (7.6%)
		J Cosmet Laser Ther.	6 (6.5%)
		Int J STD AIDS.	5 (5.4%)
		Eur J Dermatol.	5 (5.4%)
		Dermatol Surg.	5 (5.4%)
		Other 36 Journals	64 (69.6%)
3	69	J Huazhong Univ Sci Technolog Med Sci.	42 (60.9%)
		Int J Dermatol.	6 (8.7%)
		Br J Dermatol.	5 (7.2%)
		Clin Exp Dermatol.	3 (4.3%)
		J Eur Acad Dermatol Venereol.	2 (2.9%)
		Other 10 Journals	11 (15.9%)
4	58	J Invest Dermatol.	7 (12.1%)
		Photomed Laser Surg.	6 (10.3%)
		Arch Dermatol Res.	5 (8.6%)
		Int J Dermatol.	4 (6.9%)
		Br J Dermatol.	3 (5.2%)
		Other 27 Journals	33 (56.9%)
5	56	Dermatol Surg.	8 (14.3%)
		Chin Med J (Engl).	6 (10.7%)
		J Eur Acad Dermatol Venereol.	4 (7.1%)
		J Dermatol.	4 (7.1%)
		Clin Exp Dermatol.	3 (5.4%)
		Other 24 Journals	31 (55.4%)