



Original Article

# Scientific publications in gastroenterology and hepatology in Taiwan: An analysis of Web of Science from 1993 to 2013

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## Abstract

**Background:** Scientific publications are important for evaluating the achievements of a medical specialty or discipline. Gastroenterology and Hepatology is a medical specialty in great demand in Taiwan, therefore, this study aimed to analyze the Gastroenterology and Hepatology publications from 1993 to 2013 in Taiwan, using the Web of Science (WoS) database.

**Methods:** Scientific publications from departments/institutes of gastroenterology and hepatology were retrieved and analyzed from the WoS database, which included articles published in the Science Citation Index Expanded and Social Science Citation Index journals from 1993 to 2013.

**Results:** Among 229,030 articles published from departments/institutes of gastroenterology and hepatology worldwide during 1993–2013, 5061 (2.21%) were published in Taiwan, ranking the country 13<sup>th</sup> in the world. In total, 4759 articles from Taiwan were selected for further analysis, excluding meeting abstracts and corrections. During these two decades, the number of gastroenterology and hepatology publications increased rapidly. There were 440 articles published during 1993–1997, 646 articles during 1998–2002, 1211 articles during 2003–2007, and up to 2462 articles during 2008–2013. However, the mean number of articles cited decreased from 25.35 to 27.25 to 20.64 to 7.28, and the mean impact factor of publishing journals decreased from 5.0 to 4.20 to 4.13 to 4.03 during 1993–1997, 1998–2002, 2003–2007, and 2008–2013, respectively. Most of those publications belong to the subject category gastroenterology and hepatology (2346 articles, 49.30%), followed by surgery (677 articles, 14.23%), medicine, general and internal (358 articles, 7.52%), oncology (316 articles, 6.64%), and pharmacology pharmacy (286 articles, 6.01%). The *Journal of Gastroenterology and Hepatology* published the most papers (326 articles, 6.9%), followed by *World Journal of Gastroenterology* (201 articles, 4.2%), *Hepato-Gastroenterology* (165 articles, 3.5%), *Gastrointestinal Endoscopy* (159 articles, 3.3%), and *Hepatology* (146 articles, 3.1%).

**Conclusion:** Scientific publications from departments/institutes of gastroenterology and hepatology in Taiwan increased rapidly from 1993 to 2013. However, there were decreasing trends in the number of articles cited and journal impact factors.

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**Keywords:** citations; gastroenterology and hepatology; H-index; impact factor; publications; Web of Science

Conflict of interest: The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

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## 1. Introduction

Gastroenterology and Hepatology has become a specialty medical discipline. The Gastroenterology Society of Taiwan was established in 1970 in Taiwan. In 2014, the Gastroenterology Society of Taiwan had 1881 members and 1551 certified specialists. The main missions of gastroenterology and hepatology in Taiwan are to improve clinical practice and research.

Scientific publication is one of the objective measurements by which to evaluate the effects and achievements of research, especially publication in peer-reviewed journals. Sorrentino et al.<sup>1</sup> screened and reviewed the top 40% of journals for liver/gastroenterology publications during 1992–1996 to compare publications from Western Europe, USA, and Japan. The results revealed that the UK had the highest total impact factor and the highest number of papers among nations in Europe, and that the total impact factors of USA-produced papers exceeded that of papers from Europe by 20%.<sup>1</sup> Gao et al.,<sup>2</sup> comparing the scientific publications in gastroenterology and hepatology journals from Chinese authors by retrieving data from the PubMed database, found that the number of articles increased significantly from 1996 to 2005, and the accumulated impact factor of the articles from Taiwan was higher than that from Mainland China or Hong Kong.

Web of Science (WoS) is an official powerful research database provided by the Thomson Scientific and Health Care Corporation since 2004. The WoS database provides affiliation of all authors, citation numbers of published articles, and access to Thomson Reuter's multidisciplinary databases of bibliographic information such as the Science Citation Index Expanded (SCI-E), Social Sciences Citation Index (SSCI), the Arts and Humanities Citation Index, and Journal Citation Report (JCR).<sup>3–5</sup>

To date, no study has analyzed the academic achievements of departments/institutes of gastroenterology and hepatology in Taiwan, thus, the aim of this study was to analyze the scientific publications from departments/institutes of gastroenterology and hepatology in Taiwan from 1993 to 2013 using the WoS database.

## 2. Methods

The WoS database was accessed through the Taipei Veterans General Hospital Library, Taipei, Taiwan website on December 10, 2014. In the first stage, international comparison of research outputs by departments/institutes of gastroenterology and hepatology worldwide was done. Publications in the SCI-E and SSCI with authors' addresses containing "gastroenterology or digestive or hepatology or liver", including all article types, from January 1, 1993 to December 31, 2013, were searched. The number of publications from each country/area worldwide was obtained. In the second stage, publications from the departments/institutes of gastroenterology and hepatology in Taiwan in the same study period (1993–2013) and data sources from SCI-E and SSCI were searched. The types of publications included articles, letters, reviews, proceedings papers, editorials, and notes. Meeting abstracts and corrections were not

included. All published annual research output, research output in 1993–1997, 1998–2002, 2003–2007, and 2008–2013, WoS subject category, authors (including all authors), organization/institute which published articles, and name of journal in which articles were published were analyzed.

In order to analyze the citation number of published articles and the impact factors of published journals, we also obtained the citation number of each paper from WoS and impact factor of published journals from the 2013 JCR. To compare the research output among different gastroenterology/hepatology institutes in Taiwan, we obtained not only the number of published papers, total and mean citation numbers, cumulative and mean impact factors of each institute, but also the H-index, which measures both the productivity and citation impact of the publications of an institute. Publications from the National Yang-Ming University included publications from its major teaching hospital, Taipei Veterans General Hospital, without double counting. Linkage of WoS citation number and JCR impact factors was performed using Microsoft SQL Server 2008 (Microsoft Corporation, Redmond, WA, USA).

Results from the first and second stages were expressed as descriptive data (count, percentage, range, mean, and standard deviation). Analysis of variance, Student *t* test, and  $\chi^2$  test were used to assess the significant differences in mean citation numbers and impact factors among different study periods. The trends in number of publications and mean impact factor by different time period were analyzed by Jonckheere–Terpastra test and analysis of variance test, respectively (SPSS version 20.0; SPSS Inc., Chicago, IL, USA). A two-tailed *p* value < 0.05 was considered statistically significant.

This study was conducted according to ethical principles for medical research in the Declaration of Helsinki.

## 3. Results

By searching the WoS database, including articles published in SCI-E and SSCI journals, we found 229,030 articles published in gastroenterology and hepatology worldwide during 1993–2013. Table 1 shows the top 15 prolific country/areas producing articles published worldwide. Taiwan published 5061 articles (2.2%) and was ranked 13<sup>th</sup> during 1993–2013. Annual totals of articles published from departments/institutes of gastroenterology and hepatology in Taiwan increased rapidly from 49 articles in 1993, to 191 articles in 2003, and 518 in 2013 (Fig. 1).

According to the WoS subject categories, 2346 (49.3%) articles were published in gastroenterology and hepatology, followed by surgery (677 articles, 14.2%), medicine, general and internal (358 articles, 7.5%), oncology (316 articles, 6.6%), and pharmacology and pharmacy (286 articles, 6.0%; Table 2).

For journals in which articles were published from the departments/institutes of gastroenterology and hepatology in Taiwan, 326 (6.9%) articles were published in the *Journal of Gastroenterology and Hepatology*, followed by *World Journal of Gastroenterology* (201 articles, 4.2%), *Hepato-Gastroenterology* (165 articles, 3.5%), *Gastrointestinal Endoscopy* (159

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