# The Bibliometric Characteristics of Chinese Medical Core Journals

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To provide bibliometric evidence for Chinese medical journals to be considered for the evaluation system of core journals, the authors have undertaken a comparative study on bibliometric characteristics between Chinese core journals and common journals (journals not included in *A Guide to the Core Journals of China*). There are 203 Chinese medical core journals and 440 Chinese common journals. Impact factor, ratio of articles supported with funding sources (foundation), total yearly pages and average article length of core journals are significantly higher than those of common journals in China. Medical editors can take effective measures to improve academic levels and journal impact by considering factors from this study, such as having a proper and short publication cycle, increasing the impact factor, concentrating on articles with foundation support, publishing more high-impact papers, increasing substantive content and publishing more articles with abstracts. Serials Review 2011; 37:9–13.
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## Introduction

Core journals are the journals that contain more articles with a higher ratio of articles with abstract (RAA), ratio of articles with references and availability within the field than other journals.[1] The familiar systems of evaluating core journals in China are *A Guide to the Core Journals of China* (Library of Peking University), *Chinese S&T Journal Citation Report* (Institute of Scientific and Technical Information of China), *A Guide to the Core Journals of Chinese Humanities and Social Sciences* (Center for Documentation and Information, Chinese Academy of Social Sciences), *Chinese Science Citation Index* (Center for Documentation and Information, Chinese Academy of Sciences) and *Chinese Social Science Citation Index* (Chinese Social Sciences Research Evaluation Center, Nanjing University).[2] Among these, *A Guide to the Core Journals of China* has the longest history, most disciplines, and maximum impact. The bibliometric indicators of evaluating journals for *A Guide to the Core Journals of China* are number of articles being indexed (3%), number of articles being abstracted (5%), citation (25%), ratio of being abstracted (number of articles being abstracted divided by total number of papers; 7%), number of Web downloads (5%), impact factor (10%), ratio of articles with foundation support (5%), citation by other journals (35%) and number being fully covered by the *China National Knowledge Infrastructure* or other databases (5%).

Core journals play an important role in scientific research management, academic evaluation, faculty recruitment and promotion.[3] Core journals are equally important to authors and editors. Authors depend on core journal publications for career promotion and research funding, and editors want core journals because they attract more and more articles. Since the introduction of the core journal in China, the concept of core journals has significantly influenced the researchers' decisions about where to publish their works, the researchers' preference for those journals in seeking important articles, and the librarians' dependence on them for library collections. Core journals have gained acceptance as a measure of journal quality. Core journals enjoy elevated treatment in academic journals and serve as models for best practices on the publishing side of journal management and production. Therefore, editors of many academic journals consider inclusion in the evaluation system of core journals as the ultimate goal. Although some researchers have differing opinions on the possible exaggerated function of core journals in evaluating scientific performance of a scientist and the estimation of the journal quality, core journals do play an increasingly important role in academic evaluation.[4–8]

In this paper the authors have taken the comparative study on publication cycle, impact factor, ratio of articles with foundation support, total yearly pages, article length, total yearly articles (TYA), number of articles with abstracts (NAA) and ratio of articles with abstracts (RAA) between medical core journals and common journals that are not enrolled in *A Guide to the Core Journals of China* to explore the bibliometric properties of Chinese core journals and to provide a reference for managing academic journals and being enrolled by evaluation system of core journal in China.

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## Objectives

The authors had investigated 643 medical journals published in 2007 and held in the library of Xinxiang Medical University. The journals spanned a broad range of perceived quality and were familiar to students and faculty of medical universities or ones that were commonly used and recognized by clinicians in China. All of these journals are categorized in the following areas: Andrology, Allergy, Anatomy & Morphology, Anesthesiology, Clinical Neurology, Dermatology, Emergency Medicine, Gastroenterology & Hepatology, Genetics & Heredity, Hematology, Healthcare Sciences & Services, Immunology, Infectious Diseases, Medicine, General & Internal, Medical Laboratory Technology, Neurosciences, Obstetrics & Gynecology, Oncology, Ophthalmology, Otorhinolaryngology, Pathology, Pediatrics, Pharmacology & Pharmacy, Physiology, Psychiatry, Psychology and Geriatrics & Gerontology. There were 203 core journals and 440 common journals. Core journals are those included in *A Guide to the Core Journals of China* (2008 edition).

## Methodology and Statistical analysis

The authors manually searched the indicators of 643 medical journals, such as publication cycle (quarterly, bimonthly, monthly and semimonthly), total yearly issues, total yearly pages, total yearly articles (TYA) and number of articles with abstracts (NAA). Publication cycle was used to determine the publication frequency (total yearly issues). Article length was total yearly pages divided by TYA; RAA (ratio of articles with abstracts) was NAA divided by TYA. Impact factor and ratio of articles supported with foundations were obtained from *Chinese S&T Journal Citation Report* (Expanded Edition). The impact factor for 2007 was the number of citations in 2007 to articles published in 2005 and 2006 divided by the number of articles published in the same period. Articles supported with foundation means articles with research funding or financial support. Foundations included the National Natural Science Foundation of China, National High Technology Research and Development Program of China, China Key Program on Basic Research, Outstanding Youth Grant from the National Natural Science Foundation of China, Major State Basic Research Program of China, National Science & Technology Supporting Program and financial support from different universities or research centers in different provinces. All indicators were entered into an electronic database manually. Each indicator was statistically analyzed between Chinese core journals and Chinese common journals using SPSS 17.0. *One-Sample Kolmogorov–Smirnov Test* is used for testing normality. *Levene's Test* is used to assess the homogeneity of variances. Both of these tests are preconditions for *t-test*. If variances are significantly different or distribution of parametric data is not normal, *non-parametric test* will have to be used.

## Results

### Publication Cycles and Frequencies of Core Journals and Common Journals

Table 1 shows the publication cycles of core journals and common journals. Journal publication frequency is the number of issues published each year. It is with normal distribution in both kinds of journals, $9.98 \pm 4.49$ for core journals and $7.41 \pm 3.28$ for common journals. *Levene's test* shows variance between these two kinds of journals ($F = 21.417$, $P = 0.000$), and there is significant difference between core journals and common journals ($P = 0.000$).

**Table 1.** Publication cycles of core journals and common journals

| Publication cycle | Core journals (%) | Common journals (%) | Total (%) |
| --- | --- | --- | --- |
| Quarterly | 4 (8.5) | 43 (91.5) | 47 (100.0) |
| Bimonthly | 85 (22.9) | 286 (77.1) | 371 (100.0) |
| Monthly | 103 (49.3) | 106 (50.7) | 209 (100.0) |
| Semimonthly | 11 (68.8) | 5 (31.2) | 16 (100.0) |
| Total | 203 (31.6) | 440 (68.4) | 643 (100.0) |

### Comparison of Impact Factor between Core Journals and Common Journals

Figure 1 shows the impact factors of core journals and common journals. Journal impact factors are $0.768 \pm 0.383$ for core journals and $0.467 \pm 0.281$ for common journals. Both are with normal distribution. *Levene's test* shows variance is different between the two kinds of journals ($F = 22.376$, $P = 0.000$). There is significant difference between core journals and common journals ($P = 0.000$).

For 203 core journals, the maximum value of impact factor is 2.402 and the minimum value is 0.218. When the impact factor is sorted in descending order, the minimum impact factor for former 80% core journals is 0.479. That is to say, the impact factor of 80% core journals is higher than 0.479.
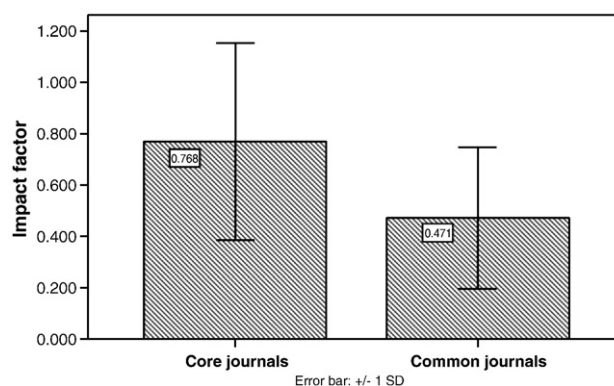
### Ratio of Articles Supported with Foundations for Core Journals and Common Journals

Figure 2 shows the ratio of articles supported with foundation of core journals and common journals. Ratios of articles supported with foundation are $0.375 \pm 0.205$ for core journals and $0.207 \pm 0.216$ for common journals; both ratios are with normal distribution. *Levene's test* shows variance is homogeneous between the two kinds of journals ($F = 2.134$, $P = 0.145$). There is significant difference in the ratio of articles supported with foundations between core journals and common journals ($P = 0.000$).
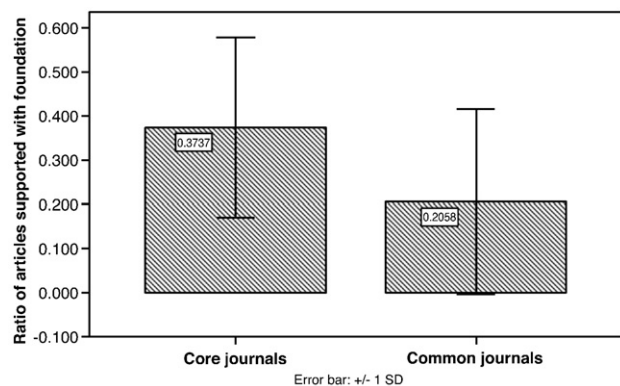
When the ratio of articles of core journals that are supported with foundations is sorted in descending order, the maximum value is 0.938 and the minimum is 0.008. The ratio of articles supported with foundations for former 80% core journals is higher than 0.187.

### Comparison of Total Yearly Pages between Core Journals and Common Journals

Figure 3 shows the total yearly pages of core journals and common journals. Total yearly pages are $977.17 \pm 518.11$ for core journals



**Figure 1.** Impact factor of core journals and common journals.

**Figure 2.** Ratio of articles supported with foundation of core journals and common journals.



**Figure 4.** Average article length of core journals and common journals.
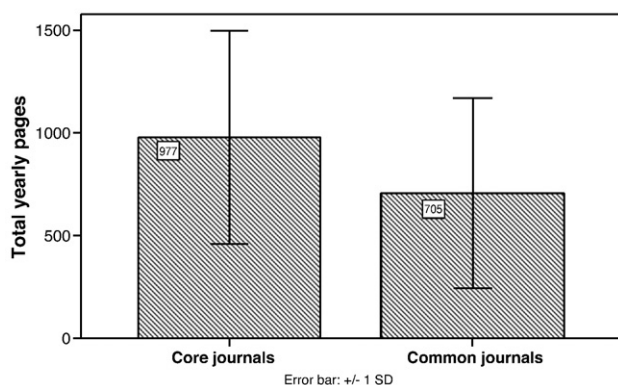
and $705.28 \pm 416.26$ for common journals. Both are with normal distribution. *Levene's test* shows variance is homogeneous between the two kinds of journals ($F = 2.377$, $P = 0.124$). There is significant difference in total yearly pages between core journals and common journals ($P = 0.000$).

When the total yearly pages of core journals are sorted in descending order, the maximum total yearly pages is 3,150 and the minimum is 186. Total yearly pages of former 80% core journals are more than 576.
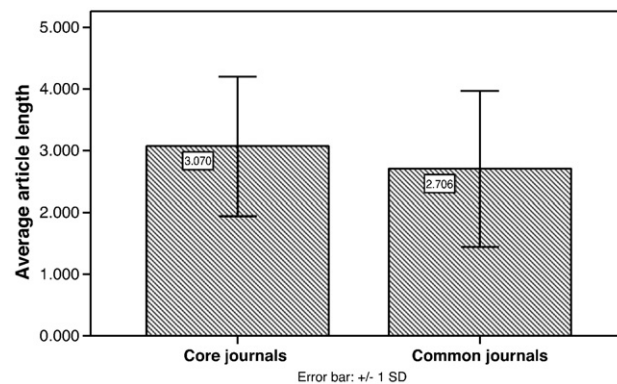
## Comparison of Article Length between Core Journals and Common Journals

The average article length is the total yearly pages divided by the number of article published in a year. Figure 4 shows the average article length of core journals and common journals. Both are with normal distribution. They are $(3.07 \pm 1.13)$ pages·article$^{-1}$ for core journals and $(2.71 \pm 1.26)$ pages·article$^{-1}$ for common journals. *Levene's test* shows variance is homogeneous between the two kinds of journals ($F = 0.591$, $P = 0.442$). There is significant difference in average article length between core journals and common journals ($P = 0.000$).

When the average article length of core journals is sorted in descending order, the maximum average article length is 9.735 pages·article$^{-1}$ and the minimum is 1.177 pages·article.$^{-1}$ The average article length of former 80% core journals is larger than 2.279 pages·article.$^{-1}$



**Figure 3.** Total yearly pages of core journals and common journals.

## TYA, NAA and RAA of Core Journals and Common Journals

NAA is the number of articles with abstracts published in a year. RAA is NAA divided by TYA. Table 2 shows the TYA, NAA and RAA of core journals and common journals.

There is no statistical difference in NAA and TYA between core journals and common journals ($P = 0.063$, $P = 0.408$), but the difference is significant in RAA ($P = 0.000$). The maximum TYA and NAA are 1, 989 and 1, 647; the minimum values are 83 and 16. TYA and NAA of former 80% core journals are larger than 184 and 120, respectively.

## Analysis and Discussion

### Publication Cycle and Publication Frequency of Core Journals

In these 643 Chinese medical journals, there are 371 journals published bimonthly and 209 monthly journals (see table 1). These two publication frequencies account for 90.2% of the journals; therefore, bimonthly and monthly are the main publication cycles in Chinese medical journals. Core journals have a larger percentage with shorter publication cycles. There are only four core journals in forty-seven quarterly journals and eighty-five core journals in 371 bimonthly journals. With the study of publication frequency, the authors have found that core journals have an obviously higher publication frequency than common journals. This finding demonstrates that the shorter the publication cycle, the more the chance to be a core journal. The reasons for this phenomenon may be that the journal with a shorter publication cycle will have greater timeliness and more information capacity (substantive content).

**Table 2.** TYA, NAA and RAA of core journals and common journals

| Journal | TYA | NAA | RAA |
|---|---|---|---|
| Core journal | $355.74 \pm 249.10$ | $256.59 \pm 204.27$ | $0.726 \pm 0.208$ |
| Common journal | $310.09 \pm 280.82$ | $200.35 \pm 169.68$ | $0.694 \pm 0.251$ |
| *Levene's* test | F = 0.686, P = 0.408 | F = 3.461 P = 0.063 | F = 13.203 P = 0.000 |

Note: TYA: Total yearly articles; NAA: Number of articles with abstracts; RAA: Ratio of articles with abstracts. *Levene's* test means the test for equality of variance. Each kind of data is with normal distribution. Except for RAA, the variance is equal for TYA and NAA between core journals and common journals.

In 2007 Liu[9,10] reported that the journal with a shorter publication cycle will have a higher impact factor and immediacy index, which highly correlates with the current findings. With various comparisons, the authors have found that the journal with a shorter publication cycle will have obvious competitive advantages. Editors, therefore, should try to shorten the publication cycle in producing journals—if there are enough articles.

### Impact Factor and Ratio of Articles Supported with Foundation Sources

The impact factor and ratio of articles supported with foundations for core journals are significantly higher than those of common journals. Impact factor has always been one of the indicators in an evaluation system of core journals since its introduction in *A Guide to the Core Journals of China* (1996 edition). Ratio of articles supported with foundations is a new indicator in *A Guide to the Core Journals of China* (2008 edition). Although impact factor only takes 10% and ratio of articles supported with foundation only takes 5% in the evaluation system of core journals, both play important roles in evaluating medial core journals in China.[11] Therefore, it stands to reason that core journals have a higher impact factor and ratio of articles supported with foundations than do common journals.[12] Hou (2005) had investigated the ratio of articles supported with foundations in 2004 for six oncological core journals. There were 539 articles supported with foundations for a total of 1,426 articles, and the ratio was 37.80%, which is very close to current results and obviously higher than 10.40% reported by[13] with investigating seventeen internal medicine core journals.

This conclusion indicates that state and local governments are gradually paying more attention to medical research funding, and articles supported with foundation money are increasing. Additionally, for the important role of core journals in academic evaluation in China, core journals have more of a chance to collect articles supported with various research foundations than do common journals. So it is important to improve the impact factor in the practice of running journals and to pay more attention to articles supported with funding when soliciting contributions, examining and approving manuscripts and accepting manuscripts.

### Total Yearly Pages and Average Article Length of Core Journals and Common Journals

Core journals have more total yearly pages, shorter publication cycles, higher publication frequencies and longer average articles than common journals. These criteria demonstrate that the more the information capacity of the journal, the better the chance to be core journal in China [see figure 3]. The average article lengths are $(3.07 \pm 1.13)$ pages·article$^{-1}$ for core journals and $(2.71 \pm 1.26)$ pages·article$^{-1}$ for common journals. In Chinese medical journals, there are three common columns: original articles, short reports and case reports. Generally speaking, an original article is more novel and practical when compared to a short report and case report, so the original article presents rich content and academic appeal. The content of the short report and case report are relatively simple, and the article is short. So the article length can reflect the academic level of journal in some content. In the practice of running a journal, if it is difficult to shorten the publication cycle, publishers should increase journal pages, so the information capacity will be increased and publish fewer short reports and case reports. Some medical journals consciously accept short reports to fill blank spaces. This practice is extremely unfavorable to improve the impact factor and academic level of a journal, and it even has an adverse impact on the journal being enrolled by the evaluation system of core journals. It is favorable for the journal to have some published journal items, such as editorial material, letters, news, book reviews or bibliographical items, to fill the blank spaces because these items are categorized as non-research items and have no effect on the denominator of the impact factor equation.

Rajna Goblubic[14] reported that bibliographical classification of journal items affected the impact factor of large and small journals and those large journals, such as the *New England Journal of Medicine* and *Nature*, published more items categorized by WoS (Web of Science) as non-research items. Perhaps editors should not cut the article length or compel the author to reduce the number of words arbitrarily, which not only shows a great lack of respect for the author, but also may delete some valuable information.

### TYA, NAA and RAA of Core Journals

TYA of common journals is very close to that of core journals (see Table 2) and the difference is not statistical ($P = 0.408$). But the total yearly pages of core journals is significantly higher than that of common journals, which indicates that a paper in a core journal comprises more valuable information and has more citations than in a common journal. There is no significant difference in NAA between core journals and common journals. RAA of core journals is significantly higher than that of common journals, which fits the authors' expectations. Usually only the original article with a Chinese or English abstract is the most important and carries a higher academic level in medical journals. The paper without a high academic level is usually published as a short report without a Chinese or English abstract. Editors may take abstracts as one standard to examine the paper in China. Furthermore, articles with abstracts are easily being enrolled by databases. Articles with or without abstracts affect whether they are abstracted and indexed. Preferably, papers should have a Chinese and English abstract, or at least a Chinese abstract.

It is noteworthy that the above indicators are not isolated but are linked with each other. We should take comprehensive measures to improve academic levels and the impact of journals for integrated development of publications. A proper publication cycle, increasing impact factors, placing emphasis on articles supported with foundation resources, publishing more high-impact papers, increasing information capacity and publishing more articles with abstracts are important considerations for Chinese medical journals.

Of course, the above discussion is not applicable if one is interested in which journals publish the fewest papers with very high citations and enjoy a valued reputation. That concept, however, is a very different question that requires a different bibliometric evaluation system to rank journals within a field. Also, this study did not explore the differences of a five-year impact factor, immediacy index, cited half-life and citing half-life between core journals and common journals in China. These are valuable research areas for additional study.

## Notes

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