

# Current status of Science Citation Index Expanded listing of Korean medical journals and effect of PubMed electronic publication ahead of print to their impact factors

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### Abstract

This year marked the twentieth anniversary of the Korean Association of Medical Journal Editors (KAMJE). The number of member journals has increased from 105 to 257 since its inception in 1996. In the same period, the number of journals listed in the Science Citation Index Expanded (SCIE) has increased from zero to 35. The average journal impact factor (JIF) that was initially 0.13 has now increased by more than tenfold on average to 1.45 as of 2014. Many KAMJE journals that are not indexed in the SCIE are putting their best effort towards eventual inclusion. Following listing with SCIE, however, editors have turned their attention towards the JIF and have shown interest in early online publication as a means of improving the JIF. The current status of PubMed electronic publication ahead of print (EAP) was surveyed among KAMJE journals that are indexed in the SCIE, and the impact of this EAP on the improvement of the JIF was investigated. Based on the survey, more than half of the members have started or are planning on implementing EAP. However, these efforts were found to be still in their infancy, and they have been insufficient to serve as a basis for scientific analysis. Since the sample size is too small and the implementation period too short to statistically analyze the effects of early publication on the JIF, a case-by-case approach was taken. Based on case studies, it is difficult to draw conclusions yet about whether online early publication enhances the JIF.

### Keywords

Journal impact factor; Korea; Medical writing; PubMed; Publishing

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## Introduction

The Korean Association of Medical Journal Editors (KAMJE), at the time of its founding in 1996, had 105 member journals, including specialist academic journals and those published by medical schools and scholarly associations. Among the members, only five were listed in Medline, and none were included in the Thompson Reuters Science Citation Index (SCI). As such, as part of its operations, KAMJE has made a significant effort toward enabling journal listing on the Science Citation Index Expanded (SCIE) and Medline by improving the quality of Korean medical journals.

February 2016 marked the twentieth anniversary of KAMJE's establishment. The number of member journals has grown to 257, and the areas of expertise have also expanded to cover not only medical, dental, and nursing, but also veterinary, nutrition, and life sciences. Meanwhile, the number of journals registered with Medline has increased to 23. There are also 93 journals in PubMed Central (PMC), 79 in Scopus, 10 in the Emerging Sources Citation Index, and 35 in SCIE. It can fairly be said that the association has clearly reached achievements that fall in line with the objective of its establishment.

This paper takes a close look at the changes over the past 20 years with regard to the SCIE listing, which is the subject of significant attention from editors among various academic journal databases, and to the journal impact factor (JIF). Moreover, it has been observed that academic journals that have successfully been added to the SCIE have been implementing or planning to execute online early publication ahead of the printed version in order to improve their JIFs. This paper also examines the current state of this trend.

## Methods

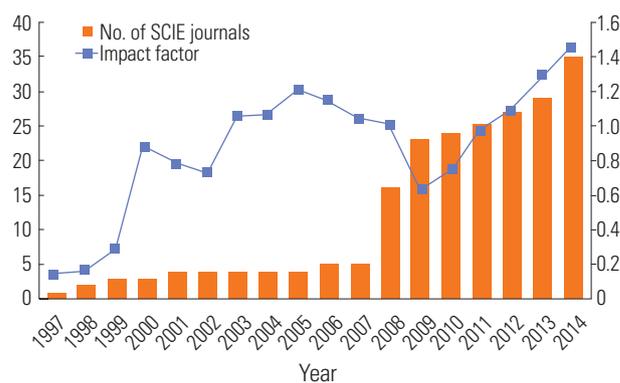
Bibliographic information of all 257 KAMJE journals were analyzed to find the listing in SCIE. Also, citation index of 35 journals listed in SCIE was calculated to trace its changes from 2014 Journal Citation Ranking and Web of Science. In order to study the current trend of Korean journals' adoption of early online publication, we conducted email survey with 35 SCIE-listed KAMJE journals, 29 of which provided responses. Since the sample size is too small and the implementation period too short to statistically analyze the effects of online early publication on the SCI JIF, we decided to take a case-by-case approach for the *Korean Journal of Radiology* (KJR), *Yonsei Medical Journal* (YMJ), *Journal of Korean Neurosurgeon* (JKNS), and the *Journal of Korean Medical Science* (JKMS). Results were presented as descriptive statistics. No ethical approval was necessary because there is no personal information.

## Results

### KAMJE member journals' SCIE listing and changes in the citation index

The addition of KAMJE member journals to the SCIE began with *Experimental and Molecular Medicine* (EMM) in 1996. The YMJ and JKMS followed in 1998 and 1999, respectively. The number of KAMJE journals listed in SCIE was merely five by 2006 (Fig. 1). However, 11 journals were added in 2008, followed by another seven in 2009. By the year before last, a total of 30 KAMJE journals had been included in the journal citation reports [1]. Now there are 35 KAMJE member journals in the SCIE. Meanwhile, the only significant difference between SCIE and SCI is that the former is published online only, whereas, for the latter, only certain excerpts are published in CD/DVD forms due to storage issues; there are no other notable differences. Among KAMJE member journals, three (EMM, YMJ, and JKMS) are part of the SCI.

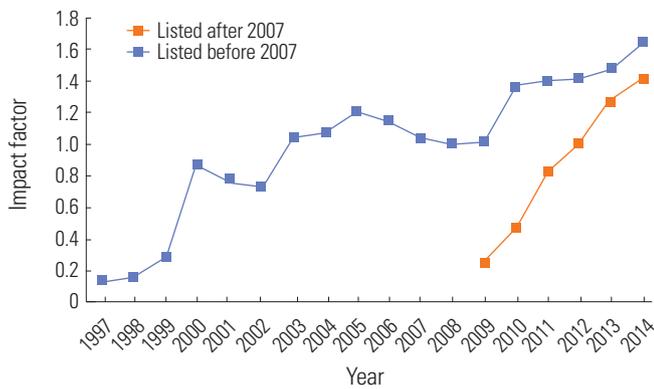
Looking at the changes in the SCI JIF of the member journals, EMM's initial JIF was only 0.13. That had increased by 2005, when the average of the four journals at the time reached 1.21. While the JIF fell in 2009 to 0.6, it has since then been steadily increasing, with the average of the 31 journals in 2014 reaching 1.45, a more-than-tenfold increase from the beginning (Fig. 1). The sharp drop in the average JIF in 2009 and 2010 is attributed to the fact that a total of 18 journals were added in 2008 and 2009 alone. At the time, Thompson Reuters added journals *en masse* per the regional selection



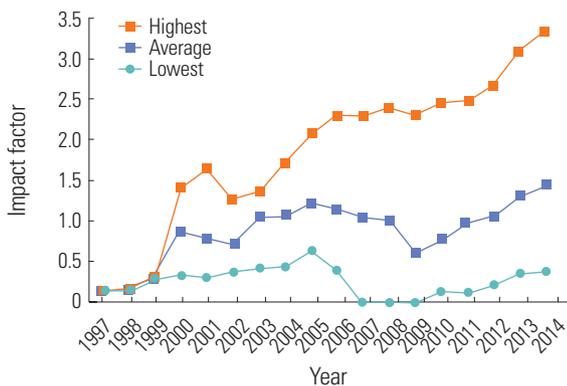
**Fig. 1.** Trends in the number of member journals listed in the Science Citation Index Expanded (SCIE) among the members of the Korean Association of Medical Journal Editors (KAMJE) and their average journal impact factor (JIF). The number of KAMJE journals listed in SCIE was five by 2006. Eleven journals were added in 2008, followed by another seven in 2009. Six more were added by 2013, and another six in the year 2014. In total, 35 KAMJE member journals are currently indexed in the SCIE. The JIF has been steadily increasing with the average of the 31 journals in 2014 reaching 1.45. The sharp drop in the average JIF in 2009 and 2010 is attributed to the fact that 18 journals were listed at once, and those journals had a relatively low JIF.

policy, and those journals had relatively low JIFs. But looking at the journals before and after 2007, it can be observed that the JIF average in general has gradually risen, with steep advances by those that were added after 2007 (Fig. 2). It is thought that the more recent academic journals might only be listed after highly rigorous preparations for being added to the index.

Considering the annual JIF highs, EMM, the first Korean medical journal to be added, looks to be leading and exhibiting an uptrend that is steeper than average (Fig. 3). In 2014, there were 31 journals that could be included in the JIF calculations. Among the 35 SCIE journals, three were excluded, as they had only been added just recently, and the *Korean Journal of Medical History* is not subject to calculation since it is part of the Arts & Humanities Citation Index. The distribution of the 31 journals shows that the JIF of about half, 15 journals, fall in line between 1 and 1.5, bringing the average to 1.452 (Fig. 4). Ten journals each have JIFs higher than 1.5,



**Fig. 2.** Changes in the average journal impact factor of Korean Association of Medical Journal Editors journals listed in Science Citation Index Expanded before and after 2007. The average journal impact factor in general has gradually risen, with steep advances in journals that were added after 2007.



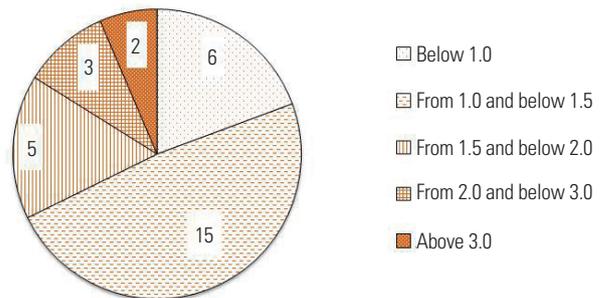
**Fig. 3.** Change in the highest, lowest, and average journal impact factor of Korean Association of Medical Journal Editors Science Citation Index journals.

with three of them between 2.0 and 3.0 (*Journal of Gynecologic Oncology*; *Allergy, Asthma & Immunology Research*; *Journal of Neurogastroenterology and Motility*) and just two above 3.0, which are EMM and *Cancer Research and Treatment*.

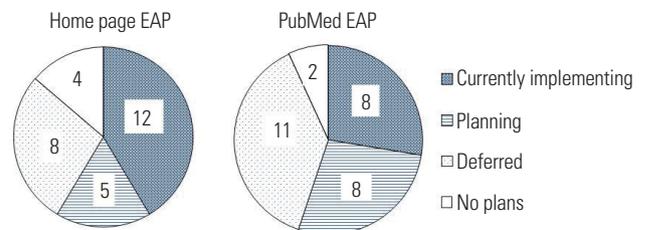
Among the 27 journals that were included in the JIF computation in 2013, only five saw decreases by a slight amount in 2014 and the rest of them saw increases. Among the journals that saw their JIFs rise by more than 0.5, EMM showed the greatest increase, going from 2.462 to 3.446. Other examples of rapid advances include the JIF of the *Journal of Gynecological Oncology*, which moved from 1.6 to 2.494; *Biomolecules & Therapeutics* from 0.841 to 1.727; the *Korean Journal of Orthodontics* from 0.37 to 1.173; and *Asian Nursing Research* from 0.418 to 1.0.

### Impact of early online view on improvement of impact factor

Twelve journals had implemented online publication on their own websites, and five said they were in planning stages, meaning more than half of the participating journals have shown interest in early publication in some form. Also, there were eight journals that have already implemented the PubMed



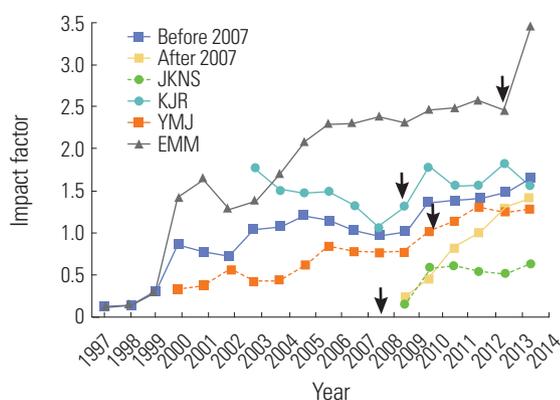
**Fig. 4.** Distribution of the journal impact factors of Korean Association of Medical Journal Editors Science Citation Index Expanded journals in 2014. About half, 15 journals, fall between 1 and 1.5, bringing the average to 1.452. Ten journals have journal impact factors higher than 1.5, with three of them between 2.0 and 3.0, and with just two above 3.0.



**Fig. 5.** Early publication status of 29 Science Citation Index Expanded journals. Among 29 Science Citation Index Expanded journals, 12 implemented online publication on their own websites, and five are in planning stages. Eight journals implemented the PubMed electronic publication ahead of print (EAP), and another eight plan to adopt it.

electronic publication ahead of print (EAP). Another eight showed interest, which indicates this topic is also of interest to more than half of the sample journals. But with regard to the timing of implementation, one journal began online publishing in 2003, one in 2009, and two in 2010, with the remaining eight having started the effort only since 2012. For PubMed EAP, all but one started since 2013, with the earlier one starting in 2007. It is clear that the journals are in their early stages of implementing these efforts (Fig. 5).

Case-by-case approach showed some implications. The KJR, which was indexed in the SCIE in 2001, began publishing on its own website in 2009. KJR had a JIF of 1.78 in 2001, right after it was listed on the SCIE. That deteriorated over time, hitting a low of 1.05 in 2008 and rising back to 1.5 after 2009. It is not clear whether early publication has had a significant impact on the improvement of the JIF (Fig. 6). It is estimated that the decrease in KJR's JIF after listing with the SCIE was due in part to the rapid increase in the number of dissertation compilations, nearly doubling over the year. On the other hand, YMJ was listed in the SCIE in 1998 and began early publication on its website in 2010. YMJ is uploading the entire full-text papers to PMC one month before its print versions are published instead of publishing them via PubMed EAP. YMJ's citation index has steadily been growing since its SCI listing, but the pace of the increase is not much different



**Fig. 6.** Relationship between early publication and journal impact factor, based on case studies. The black arrow indicates the beginning year of PubMed electronic publication ahead of print of the *Journal of the Korean Neurosurgical Society* (JKNS). The white arrows indicate the years that the *Korean Journal of Radiology* (KJR) and *Yonsei Medical Journal* (YMJ) implemented early publication through their own websites. Both YMJ and *Journal of Korean Medical Science* are included in the General & Internal Medicine subject category of the journal citation reports, and showed a very similar trend of the journal impact factor. The arrow with the diagonal lines points to the year that *Experimental and Molecular Medicine* (EMM) started publication only on the Internet. The pace of the increase of impact factor in these journals is not much different from that of the average of all Korean Association of Medical Journal Editors journals overall.

from that of the average of academic journals overall, so it was difficult to draw a conclusion about the effects of early publication. JKMS recently started online early publication through its website, so it is difficult to determine its impact on the improvement of the JIF. Both YMJ and JKMS are included in the General & Internal Medicine subject category of the journal citation reports, and showed a very similar trend in their JIF (Fig. 6).

JKNS, which has the longest history among all member journals of implementing PubMed EAP, began in 2007 and was listed on SCIE in 2008. JKNS's JIF rose sharply by the following year from 0.155 to 0.607, but there has not been much of a change since then. Rather, it has even been found to be lagging in the pace of JIF growth compared with other academic journals that got listed after 2008.

EMM, a leading domestic medical journal with regard to the JIF, has been publishing only online since January of 2013, without adopting PubMed EAP. EMM's JIF has been increasing steadily since the journal's listing and rose rapidly in 2014, just a year after it changed its publication model to online only. This impact is not entirely fit to be called the impact of early publication because the online publication date becomes the same as the date of publication of the paper. The sharp increase in JIF in 2014 can be explained by the fact that in 2010 the number of published papers surpassed 80, while the number fell to about 60 after 2013, leading to what could be a relative rally in the JIF. Additionally, EMM; the *Journal of Gynecologic Oncology*; *Biomolecules & Therapeutics*; the *Korean Journal of Orthodontics*; an *Asian Nursing Research*, which experienced significantly rapid advances in 2014, have not adopted early publication, including PubMed EAP.

## Discussion

Inclusion of 35 Korean medical journals to SCIE is a dramatic improvement of scholarly journal history in Korea. It was possible owing to the editors' devotion and sacrifice to their journals and the financial and manpower support by the publishers, most of which are academic medical societies. To exchange the information and to know current international trends, the KAMJE was established. Furthermore, KAMJE's effort to train editors and the maintenance of database such as KoreaMed, KoMCI, and KoreaMed Synapse was essential and important for journal's promotion to international level. Increase of impact factor of Korean medical journals are believed to be originated from their inclusion in PMC/PubMed because PubMed increased the visibility of them [2]. Inclusion to PubMed Central was possible by making PMC XML (journal article tag suite XML).

Above results on the effect of PubMed EAP showed still no

conclusive data due to small sample size. Many domestic academic journal editors are just as interested in the improvement of JIFs as they are in becoming part of SCIE. Although many have warned of the limitations of JIFs [3], the JIF of publications of a researcher decides almost everything in recruitment, funding, renewal, promotion, and tenure in Korea. Evaluation indicators of scholarly journals must be diversified [4]. A basic and important measure for improving JIFs would be to write high-quality articles and publish them as early as possible, however, one cannot ignore the factors external to the journal itself, such as the number of academics specializing in the subject field or the domain of knowledge. Most of the domestic academic journals still have relatively low JIFs, and as such, it might be helpful in boosting the JIF if renowned international scholars were invited to provide some review articles on popular topics.

The *Korean Journal of Internal Medicine* (KJIM) where the author (Kim BH) of this paper worked as an editor from 2007 to 2013, invited international scholars to write reviews in order to improve the chances of its entry into SCIE. KJIM, even before being added to the list, has been manually analyzing the number of citations on Web of Science. The number had been around and below 0.4 up to 2009, but thanks to the editorial board's efforts, that has begun to rise, reaching 1.3 by 2012. According to the citation analysis, the original paper was cited 1.5 times on average per article a year, and the case report reached 0.7. On the other hand, the review reached 5.5, clearly showing the benefits of an invitation. KJIM's official JIF in 2014, after being listed in SCIE, was 1.426.

Recently, many editors have been trying early online publication with hopes of improving their JIFs. This is because the recent two-year span of citation frequency is necessary to calculate JIFs, and it might be in the editors' interest to increase the exposure time by utilizing early online publication [5]. Although one study has indicated that early exposure has a positive impact on the JIF [5], another report has a more negative take on the hypothesis and concludes that comparative research to determine the effects of early exposure is essentially impossible and that it would at least not decrease the JIF of a subject journal [6]. Even if one were to determine positively that early exposure would contribute to the improvement of JIFs, if many influential academic journals participate in early publication or if they expose their papers as fast as possible via online platforms, then any positive impact that might have been present is bound to be diluted.

Early publication is a way for journals to take care of accumulated papers first, and it also means a potential right of preemption. These days, a number of prominent journals are only doing online publication, and this means the date of the paper's uploading is the date of publication, not entirely in

line with the concept of early publication. In Korea, EMM started publishing online only in 2013, uploading approved papers on a weekly basis and reducing the time span of publication.

Methods of early publication include publishing materials on the journals' own websites before the printed versions become available (forthcoming issues or online early publication), as well as publishing them on the more influential PubMed. PubMed EAP is a way for a publisher to request to upload its abstract to PubMed first. The full text is often unavailable for a PubMed EAP, usually because the commercial publisher would provide that as a service or for a fee. If there is open access, one might be able to find the full text through the journal's website, but information such as the DOI, publication date, volume and number, and page numbers might not be available.

In conclusion, the citation metrics of KAMJE member journals indicate their growth in international influence owing to concerted efforts between KAMJE and its member journals. At the time of its founding in 1996, none were listed in the SCIE, but 35 member journals are currently included in this database. More than half of these journals have interest in online early publication as a means to improve their JIFs, but it is still in its infancy and insufficient to statistically analyze its impact on the improvement of JIF. Based on case studies of KAMJE member journals, it is difficult to conclude that early publication helps with the enhancement of the SCI JIF. A longer-term approach with a larger number of journals as study subjects is warranted for more relevant research.

## Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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