Original Article

Build infrastructure in publishing scientific journals to benefit medical scientists

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Abstract: There is urgent need for medical journals to optimize their publishing processes and strategies to satisfy the huge need for medical scientists to publish their articles, and then obtain better prestige and impact in scientific and research community. These strategies include optimizing the process of peer-review, utilizing open-access publishing models actively, finding ways of saving costs and getting revenue, smartly dealing with research fraud or misconduct, maintaining sound relationship with pharmaceutical companies, and managing to provide relevant and useful information for clinical practitioners and researchers. Scientists, publishers, societies and organizations need to work together to publish internationally renowned medical journals.

Keywords: Medical journals; peer review; open access; revenue; publisher; research fraud; misconduct

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Introduction

Medical journals began at the end of 18th century, and specialist medical journals came up at the beginning of 20th century. The prosperity of medical journals came about a decade ago. Most of the landmark studies that have changed clinical medicine have been published on journals. Over the years, the number of active, peer-reviewed journals has expanded to approximately 28,000, collectively publishing more than 1.8 million articles every year. US President Barack Obama's administration declared that government-funded research papers should be made freely available within 12 months of publication.

Optimize the process of peer review

Thousands of researchers worldwide need to publish their articles and not all of them can do so in the highest ranked journals. International, scientific, scholarly peer-reviewed journals mean a lot to the scientific community and society. These journals usually check the scientific quality, relevance and interest to readers, findings that may or may not advance science. As a reader, no one wants to spend time reading vast quantities of low quality research and would be willing to pay for someone to do the filtering for quality, relevance and novelty that traditional journal editors have been doing. The coming of evidence-informed practice highlights the desirability of timely access to research evidence. Even large volume of information is available in many forms, traditional peer-reviewed journals still are the main information source for clinical practitioners and researchers (1,2).

Peer review is the process during which peers of the authors being asked to review the studies before publication. It is the peer-review process which guarantees the scientific quality of medical journals. Journals should have a highly productive and responsive peer-review system.

Reviewers and editorial members are usually volunteers who contribute to the peer-review process without reimbursement. They normally are doctors and researchers engaged in research and clinical practice of oncology. They are selected for their expertise related to the subject of an article, which makes the peer-review process works well. Reviewers and editorial members make great contributions to journals with rigorous peer review in exchange for

personal network and the prestige within their academic communities. The success of any peer-reviewed journal relies on attracting these contributors.

Editors of the *British Medical Journal* (*BMJ*) and the *Journal of the American Medical Association* (*JAMA*) have urged that peer review itself should be largely and extensively studied (3). Studies have shown that peer review is ineffective, prone to bias, and abuse and lack the power to spot errors and fraud. The time between the selection of reviewer or associate editor and the receipt of the reviews averages one to two months. But no journal could afford to abandon peer review.

Many journals have tried to streamline the review and editing processes in order to achieve short average lead times from submission to publication. Even if faster publication is an obvious advantage of journals, very short processing times may lead to some problems including the insecurity of the quality of the review.

Utilize open-access publishing models actively

Open-access publishing is gaining momentum and public acceptance worldwide. More and more articles are published open access and can be downloaded free of charge as soon as they are published electronically. Open-access journals and open-access archives are dramatically transforming the process of academic communication and especially can bring tangible benefits to academics in developing countries (4). Academicians and publishers in developing world need to be more aware of the benefits of open access and open archiving, and create a more receptive environment and fertile ground for open access journals.

A study has demonstrated that the number of open-access journals increased by 500% and the number of articles by 900% during the decade 2000-2009 (5). The Directory of Open Access Journals lists more than 8,000 open-access journals, many of which are highly regarded according to conventional metrics of excellence (6). The very best way to test the impact advantage of open access is to compare the citation counts of individual open access and non-open access articles, and analytic study has demonstrated a dramatic citation advantage for open access.

Institute for Scientific Information (ISI) study has showed that traditional journals and open-access journals have similar citation impact factors. The report revealed that of the 8,700 selected journals covered in Web of Science when the study was carried out, 191 are open-access journals. There is no significant difference in terms of citation impact or frequency with which the journal is cited.

Accumulating evidence showed that the proportion of researchers publishing in open-access journals has kept growing considerably. Open access definitely is able to widen the global circle of those who can participate in science and benefit from it (7-13). Academics in developing countries are becoming informed that they can expand the visibility of their publications by making them open access.

Among the three categories of open access, "green" open access, "gold" open access and "hybrid gold" open access categories (14), *Chinese Journal of Cancer Research* (*CJCR*) chose 'gold' open access model. "Green" open access journals permit authors to post their papers on their institution's website or personal website as soon as the article is published. There is no fee or embargo period. "Gold" open-access journals publish all articles open access, and the fees are paid by authors. "Hybrid gold" open access provides option for author to publish their articles open access for a fee or not be open-accessed without a fee.

The Study of Open Access Publishing (SOAP) project has conducted a large scale survey of the attitudes of researchers on, and the experiences with, open-access publishing (15). Around forty thousand responses were collected across disciplines and around the world, showing an overwhelming support for the idea of open access, while highlighting funding and quality as the main barriers to publishing in open access journals. Libraries, publishers, funding agencies and academics should further analyze opportunities, drivers and barriers, in the transition to open-access publishing.

Find ways of saving costs and getting revenue

"All publishing is theft", joked by a BMA's librarian, and ironically, this guy left to join Reed-Elsevier, the world's most profitable publisher of science. Medical journals mainly publish articles written by researchers, and these articles are submitted to journals for free. The tremendous cost of these researches is covered by public money. The journals conduct peer review before publishing the studies, and unpaid academics contribute to the peer review and editing process. The journals are sold to academic libraries at high prices. Annual subscription to some journals may be over 2,000 dollars. Publishers and commercial companies earned profit and grew rich from their journals. The ethics of scientific publishing are highly suspected.

Legislation should elicit laws of libel to cover medical journals. In Britain, these laws are strict. *BMJ* had once

been involved in one of largest libel cases. While some other experts argued that concern with ethical issues in publishing medical journals would make research harder to do, since scientific research is badly needed and can't afford much more barriers.

The paper and postage costs, costs associated with online submission-and-review systems and hosting platforms, costs of validating and disseminating research output must be covered anyway. According to the study conducted by Cambridge Economic Policy Associates in 2010, the average journal's cost per article for production in print and electronic formats was approximately £2,500 (16). For the American Physiological Society, the average cost per article was approximately $2,635 (17). Since in open access era, there is not much possibility of charging for access through subscriptions or licenses, one way to cover the publishing cost is author payments. This is the transformation from reader payment to author payment era. This is based on the fact that authors have funds for publication.

Although there are many funding options available for financial support for journals, including article processing fees, advertisement and social affiliations, the funding should be streamlined according to the needs and resources of the journals. Article processing charge is the central funding mechanism for large-scale full open access publishing. It is the quality and subject field of the journal that determines the processing charge authors are willing to pay.

As to open-access journals, after analyzing the author's behavior and satisfaction, effect on financial and subscription, usage and citations, researchers from Oxford Journals concluded that one charge model won't fit all journals (18). Diverse models including delayed free access, subscription access and combination with full or optional open access would be more adaptive. Open access adjustment don't necessarily lead to an actual price decrease year after year, and they may simply ameliorate the increase in price.

Deal with research fraud or misconduct

Being exposed to media public as having published fraudulent research, medical journals usually feel helpless in the face of pain. Some scientists argued that fraud had not been so often and had never harmed anybody since science is self-correcting. But in recent years we could not take it easy anymore. *BMJ* editor Richard Smith had to call editor of the *Lancet* in 2002 telling him that two major trials the *Lancet* had published were fraudulent.

Only a few countries have clear concern and response to scientific fraud or misconduct. COPE is a committee on publication ethics founded in 1997 by medical editors in Britain. It is a self-help organization for responding to research fraud or misconduct. This organization has dealt with hundreds of research misconduct cases (19,20).

Medical editors are actually at the frontier of the response process to research misconduct. Editors should lay more emphasis on and pay more attention to this issue. Misconduct cases dealt by COPE came from a few journals. It is not possible that these journals have risks while others do not.

It is necessary to let the editors know how to respond when they decide there is problem. Universities, institutions and organizations need to know what action to take when the editors inform them the possibility of research misconduct.

Maintain sound relationship with pharmaceutical companies

There is another ethical problem faced by many medical journals, the close association with pharmaceutical companies. Elsevier, one of the largest journal publishers, admitted in 2009 that it had published six "fake journals" funded by pharmaceutical companies (21). These journals were sponsored article compilation publications and were made to look like journals and lacked the proper disclosures. Pharmaceutical companies played a key role in the development and utilization of almost all new drugs during the past decades. The interests of the pharmaceutical companies, doctors, patients, regulating organizations and medical journals are the main issue of the ethical problem. Medical journals do not need to separate themselves from pharmaceutical companies intensely once the relationship with companies can be ethically sound.

The pharmaceutical companies may want patients to take their drugs even if they are not superior to other drugs. They may push drug rather than other non-drug treatments, even non-drug treatment is more important in tackling disease. Some medical journals have been bonded with pharmaceutical companies and depend on them in financial terms. Even the most prestigious medical journals publish trials funded by the industry. Most of the results of these trials are favorable to the companies.

After advertising the results of the trials, the medical journals can get profitable income by selling the reprints of the articles to the funding companies. Some companies might pay more than one million dollars for the reprints of the study they funded.

Until very recently, medical journals didn't ask their

authors and reviewers about conflicts of interest, they didn't manage conflicts of interest very effectively. Actually most authors in medical journals have financial conflicts of interest due to their relations with pharmaceutical companies. These undeclared conflicts of interest may influence the studies published and the conclusions authors reach. The intent of soliciting larger number of submissions may dilute the scrutiny of conflict of interest, and pharmaceutical companies thus may take advantage of slack journal standards. Professional editors and experienced staff need to be alert to ferret out conflicts of interest. Medical journals don't need to intensely avoid publishing articles written by authors with conflicts of interest, but need to do a better job at managing conflicts of interest.

Prove useful in clinical practice and research realm

Journals are the main link between science and practice. Medical journals should aim to deliver value appreciated by doctors and researchers, ignite thoughts and debate, and draw their attention to what might be important. Materials of limited relevance and quality which cannot answer any questions arising in practice rarely lead to change or improvement in the research and clinical practice. Journals sent to doctors are filled with complex science, most of which depends on statistical analyses doctors do not understand. There is no wonder doctors spend little time reading the research papers in journals, not to mention the time spent on reading one complex study. They are more likely to grab the information of studies on throwaways newspapers.

Journals should manage to publish more important scientific studies which can separate them from the throwaways, and attract worldwide reputation and subscription. A good medical journal is an asset not only to medical community but also to the funding institutions and organizations. Even more and more scientific findings are posted on publicly available websites rather than in scientific journals, it is the science that a journal publishes which gives the journal authority and reputation.

The Internet has dramatically and permanently changed the ways in which information can be discussed and disseminated, mostly for the better. We are in 'attention economy', and we have to compete with a variety of pleasures for doctors' attention. But medical journals have to stick to their fundamental principles and may be not that eagerly to seek publicity at any price. After all, coverage in the mass media is good for medical journals both in prestige and business terms. Patients can become even more informed than doctors by visiting journals' websites. Patients get involved in making informed clinical decisions. Some journals even have patients on editorial boards or editors. Patients are partners instead of objects any more. Still, medical journals need to enlarge their influence on the practice of medicine and research realm.

Studies showed that scholarly publishing in developing world is still dominated by conventional print format which is expensive for production and distribution (22-25). The international readership of these journals is pretty low reflecting in the low visibility and impact, which is hampering the growth of them into internationally recognized journals. Improved access can improve the citations and impact factor. Impact factor is a recognized scale for assessing journals. When impact factor is improved, it can increase the credibility and then the submissions of the journal.

Tenopir *et al*. found that medical faculty may be more comfortable with traditional format of scholarly journals. They use medical journals for much of their professional development and to stay current with progress in their field. Their reading primarily comes from recently published articles, mostly of which is from personal subscriptions. Approximately 70% of readings rely on print journals. Librarians and publishers need to find ways to provide attributes of convenience and currency and match the portability of personal subscriptions in electronic journal format for medical faculty.

To sum up, recognizing the importance of creating a positive change in the international, scientific, scholarly peer-reviewed journals scenario all over the world and more in developing countries, we believe there is urgent need to build infrastructure in the publishing and archiving, and support to benefit scholars and publishers, especially regional journals and small publishers. Only after active exploration of developing strategies, can medical journals pave the way for successful international, scientific, scholarly peer-reviewed journals.

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