



# Predatory Publishing Is a Threat to Non-Mainstream Science

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This article highlights the issue of wasteful publishing practices that primarily affect non-mainstream science countries and rapidly growing academic disciplines. Numerous start-up open access publishers with soft or nonexistent quality checks and huge commercial interests have created a global crisis in the publishing market. Their publishing practices have been thoroughly examined, leading to the blacklisting of many journals by Jeffrey Beall. However, it appears that some subscription journals are also falling short of adhering to the international recommendations of global editorial associations. Unethical editing agencies that promote their services in non-mainstream science countries create more problems for inexperienced authors. It is suggested to regularly monitor the quality of already indexed journals and upgrade criteria of covering new sources by the Emerging Sources Citation Index (Web of Science), Scopus, and specialist bibliographic databases. Regional awareness campaigns to inform stakeholders of science communication about the importance of ethical writing, transparency of editing services, and permanent archiving can be also helpful for eradicating unethical publishing practices.

**Keywords:** Publication Ethics; Periodicals as Topic; Bibliographic Databases; Non-Mainstream Science

## INTRODUCTION

Writing scholarly papers for peer-reviewed journals requires research experience, advanced language skills, and knowledge of publication ethics standards. Drafting a publishable paper is a daunting task even for seasoned authors. Authors are expected to critically analyze available scientific evidence, create new knowledge, present it in an attractive way, highlight unresolved issues, and shed light on future directions of research and practice. Journal reviewers are supposed to check all these points and provide readers with trustworthy professional information that may eventually appear in bibliographic databases.

In the era of digitization and open access the publishing landscape has changed enormously. Commercial editing services have become major players, embracing growth of research productivity. The shortened time from manuscript submission to online publication has accelerated transfer of knowledge with potentially great implications for academic promotion and science growth. As a result, the volume of open access biomedical papers increased 16-fold from 2000 to 2011, primarily due to the growth of start-up commercial publishers (1).

Major indexing databases, such as Scopus, have accepted for coverage numerous open access journals and started to mark

the access mode to direct their users to full-texts on the publishers' websites. PubMed Central repository became the largest hub of freely available biomedical articles, providing full-text access to 20% of PubMed-indexed items in 2007 and 27% in 2011 (2). The Directory of Open Access Journals (DOAJ) was launched in 2003 to list open access journals with peer review and editorial quality controls. The number of listed journals was increasing rapidly until the DOAJ indexers introduced strict indexing criteria in 2014 (3) and delisted approximately 3,300 periodicals in 2016 (4). The DOAJ now serves as a "white list" of open access journals with the number standing at 9,458 (as of February 21, 2017) (5).

## DECLINE IN PUBLISHING QUALITY

With the growing volume of open access literature the overall quality has declined because of the publishers' primary interest in author fees and substandard or non-existent peer review. One of the EU-sponsored surveys of 50,000 researchers in 2010 found that 30% of the respondents do not submit their manuscripts to open access journals because of the absence of high-quality open access periodicals in their field of professional interest (6). A survey of Indian authors of 3,300 articles demonstrated that

more than half of them, and particularly those affiliated to private academic institutions with uncertain publishing strategies and poor monitoring, published their research in 'predatory' journals (7).

The quality of a large number of subscription periodicals has also declined, but the reasons for that are more complex and related to poor research methodology in policy-related fields of science, such as nutrition, education, and epidemiology (8). The deficiencies of both publishing models have been analyzed in the context of negative implications on quality research performance in emerging scientific powers and growing academic disciplines (9,10).

One of the reasons of the declining quality of open and subscription publications could be the absence of editorial policies for disclosing contributions of brokering editing agencies. Their commercial relationships with clients (i.e., authors and publishers), involvement in peer review, and quality of editing services remain largely obscure. Such agencies often operate in non-Anglophone countries and target small indexed journals (11). Scientific authors, who rely on such editing agencies, lose an opportunity to improve their writing and revising skills (12).

## PREFERABLE ACCESS OPTIONS

There are currently 4 access options (subscription, gold open, green, and platinum), which are variably employed across countries with established research and publishing infrastructure and emerging scientific powers (13). The subscription model is still employed by some traditional publishers, such as Elsevier and Springer Nature, providing access to readers who pay regular subscription or pay-per-view fees. Libraries and universities with large funds usually cover access fees to the subscription journals and thus help their faculty members and researchers benefit from processing reliable and well-edited professional information. Many established subscription publishers now offer gold open access to their authors, who target journals with hybrid (subscription and gold open access) or entirely gold open access models and usually cover related publication and archiving charges from their research funds. Scarcity or complete lack of such funds is the main barrier toward wide visibility for authors from non-mainstream countries, whose publication charges can be waived by wealthy traditional publishers. The PubMed Central repository is the main open digital archive for biomedical and allied articles, which are published for gold open access. Green access implies archiving of accepted versions of articles in institutional repositories, which are gaining popularity in countries where increasing visibility of their research papers, theses, recommendations, and other grey literature items is a priority. Finally, platinum open access is the most author- and reader-friendly business model, which is financially sustained by institutional sponsors and other donors, covering all publication

expenses, and providing journal contents freely for the global readership.

Opening access to publications, and particularly adopting a 'green' archiving policy, is essential for improving visibility of non-mainstream science countries and academic disciplines with limited funding and a small number of indexed journals (14,15). Gold open access, which was adopted as a priority for British academic and research institutions in 2012, relied on the advances in academic disciplines of interest to the global community, well-established publishing industry, and substantial research funding available for British and European researchers at that time (16).

A recent analysis of 543 Croatian papers indexed in 2014 by PubMed revealed that 55% were published in gold open access journals (17). To further improve visibility of their biomedical papers, Croatian experts encourage archiving of all local research in a country-based repository. A study of papers published by researchers from Seoul National University also revealed a growing popularity of open access with the proportion of their open access papers indexed by Scopus increasing from 4.2% in 2006 to 18.5% in 2014 and a doubling of references to openly available Korean medical sources (3% in 2008 and 6% in 2011) (18).

An investigation of 63 orthopedic journals with impact factors revealed that only 5 (8%) journals adopted open access and 20 (31.7%) journals opted for hybrid (subscription and open access) model (19). There was no difference in the distribution of articles with high level of evidence between subscription and open access orthopedic journals, which may reflect the growing scientific prestige of open access in this field. Interestingly, another report suggested that scarce funding for opening access to evidence-based literature, and particularly to systematic reviews, may limit knowledge transfer and hamper progress in musculoskeletal medicine (20). In the field of metabolomics, a rapidly expanding research domain, a solution was found by launching an open repository of datasets and individual papers called *MetaboLights* (21).

In the field of nursing with limited funding for research and gold open access, the economically acceptable strategy is green open access (22). Gold option is becoming increasingly unaffordable for academic institutions even in developed countries (16).

While most experts recognize the advantages of open access, there are also those who criticise and blacklist some gold open access publishers for damaging reputation of the publishing enterprise, corrupting science, and posting online pseudoscientific papers for a fee. Jeffrey Beall, a librarian from the University of Colorado (Denver, CO, USA) and a pioneer in the field, started following publication activities of the so-called predatory open access publishers since 2008, and maintained a list of predatory publishers and standalone journals on the scholarly open access blog. He revealed weaknesses of some commercial

online publishers making huge profits by launching hundreds of journals, accepting thousands of papers without proper peer review, editorial checks, permanent archiving, and wasting authors' efforts. The estimated number of articles in predatory journals increased from 53,000 in 2010 to 420,000 in 2014 with an average processing charge of 178 USD per article (23). The number of predatory publishers has also grown from 18 in 2011 to 1,155 in 2017 while the number of standalone journals—from 126 in 2013 to 1,297 in 2017 (24). Beall proposed criteria to identify predatory publishers, which were based on their journal titles, editorial boards, poor/redundant contents, and non-adherence to publication ethics standards. The absence of the quality checks in predatory journals became apparent when fake papers submitted to 304 gold open access journals in 2013 were accepted by 60% of them, mostly listed on Beall's blog (25). There were even some established subscription publishers that failed to detect flaws in the hoax paper, suggesting that the crisis with the system of quality checks and peer review is universal.

In one of his latest opinion pieces, Beall described facts of debasing science by publishing controversial papers across journals, refraining from pointing exclusively to open access journals (26). Our article further stressed the issue of wasteful open access and subscription publication activities of individual authors, editors, editorial agencies, and conference organizers (27).

Predatory publishing activities erode the scientific basis of disciplines with a relatively small number of indexed journals. Desperate authors, who fail to publish their potentially good research in internationally recognized influential journals, may choose to target predatory journals as a last resort. For example, a recent analysis of 59 rehabilitation journals blacklisted by Beall revealed that 5,610 articles are already published in these journals (28). Another analysis identified 140 predatory nursing journals with 4,238 articles published by 75 publishers. OMICS International published several nursing journals. Despite the declining number of articles per issue, and the closure of some journals after publishing 1 or 2 volumes, the number of predatory nursing journals has been increasing annually (29).

Established publishers arrange thematic issues and invite leading experts to share their knowledge and valuable research data with readers. Such invitations are rare, and they are aimed at highlighting unresolved questions and clarifying new scientific directions. The invited manuscripts go through peer review as regular submissions and, upon acceptance, are published without any charges to authors. With the rise of start-up commercial open access publishers, invitations to submit manuscripts and join editorial boards have become common and indiscriminate. An analysis of 311 journal invitations in 2014–2015 revealed that 79% were from predatory journals, mostly from OMICS Publishing Group, SciDoc Publishers, and Jacobs Publishing (30). Scientific authors were advised to filter out and block all invitations from predatory journals and develop an institutional poli-

cy discouraging submissions to blacklisted journals.

Many researchers with initial successful publications indexed by prestigious bibliographic databases and seasoned authors from non-mainstream science countries, who seek international recognition have been trapped by predatory journals, responding to their invitations to submit manuscripts and join editorial boards. Predatory publishers have exploited the reputation of their editorial board members to further attract unscrupulous authors and charge them for fast, unchecked and non-archived publications. As a result, many potentially useful research papers from non-mainstream science countries continue to be poorly visible or even disappear from websites of some journals.

### EMERGING STRATEGIES TO IMPROVE PUBLISHING STANDARDS

What can be done to fight against and eradicate predatory publishing? One option is to increase awareness of the problem among stakeholders of science communication in vulnerable regions. A recent ethics declaration drafted and endorsed by editors from South Eastern European Countries is an attempt to update authors, reviewers, editors, and publishers about acceptable publishing activities and preferable access options (31). It is primarily aimed at ensuring transparency of all editing and publishing activities, including those facilitated by commercial agencies, and enforcing statements of the global editorial associations, such as the International Committee of Medical Journal Editors (ICMJE), the Council of Science Editors (CSE), and the Committee on Publication Ethics (COPE). The document stresses the importance of inviting experts in publication ethics, statistics, language, and design to serve as in-house journal quality evaluators. It also calls to increase visibility of publications by permanently archiving contents and joining the Open Researcher and Contributor ID (ORCID) initiative. Improving the quality and attractiveness of regional journals, supported by professional societies, will help authors choose relevant targets for their research and circumvent irresponsible publishers.

Academics from India and Kazakhstan consider mandatory archiving in their institutional repositories as a means for monitoring the quality and preventing predatory publishing activities (7,32). There are also Russian (Eurasian) projects to improve access to local periodicals by joining the open access movement and expanding archiving in electronic libraries, which may increase transparency and reveal plagiarized or otherwise unethical publications (11,33).

In medicine, most influential evidence-based journals are visible in the MEDLINE bibliographic database and can be searched through the PubMed platform. MEDLINE is a highly selective database, accepting for coverage periodicals with high ethical standards and professional value. However, the PubMed platform may accommodate abstracts of articles that do not meet

the MEDLINE strict selection criteria. Articles from non-biomedical disciplines, which are archived by the PubMed Central repository, can be retrieved along with evidence-based medical items (34). Among authors from developing countries, there is still poor understanding of the differences between PubMed and MEDLINE, which is exploited by some publishers, archiving their contents in PubMed Central but failing to meet MEDLINE standards (35).

A recent analysis of indexing of 944 apparently predatory journals revealed that only 9 (0.25%) are covered by the Science Citation Index Expanded (SCI-E) database (36). Significantly more predatory journals (n = 28) are indexed by the Emerging Sources Citation Index (ESCI), which is visible in the Web of Science platform, and Scopus (n = 56). Coverage of predatory journals is relatively high in some specialist databases, such as Veterinary Science Databases (n = 45) and Inspec (n = 22). MEDLINE indexes only 5 and EMBASE only 3 predatory journals. Experts suggest to monitor and discontinue indexing of predatory journals by prestigious databases and online platforms, such as PubMed of the National Library of Medicine of the USA. (37).

## CONCLUSION

The ease of online publishing has led to a decline in the quality of scholarly evidence accumulation. It is thought that some start-up publishers are primarily responsible for 'polluting' the Internet with poor quality, unethical, and debasing science contents. Jeffrey Beall's list of predatory publishers and standalone journals, which was regularly updated on the scholarly open access blog until recently, set a good example of increasing awareness of unacceptable publishing practices. The list included sources that were threats to rapidly developing academic disciplines with a small number of indexed journals. The last updates of the list are currently available on backup sites, and it is expected that a revised blacklist of unethical publishers and journals will be available on the Cabell's International directory soon (38).

Major editorial associations, such as ICMJE and CSE, have already incorporated statements on predatory sources in their updated and widely publicised recommendations. A recently issued official document of the World Association of Medical Editors (WAME) is yet another attempt to increase transparency of the publishing enterprise and help stakeholders of science communication distinguish predatory or 'pseudo-journals' from legitimate press (39). The paper provides a balanced approach, encouraging authors and editors to avoid contributing to blacklisted journals, on the one hand, and considering initiatives to 'legitimize' sources incorrectly labelled as predatory, on the other. What is at stake is the quality of journal editing and publishing, which requires the involvement of highly skilled specialists at all stages of manuscript processing, regardless of access modes. The issue is getting more complicated in non-mainstream sci-

ence countries and across rapidly developing academic disciplines, where expertise is a scarce commodity and research funds are limited.

Unchecked, erroneous and apparently unethical papers, which are currently produced on an unprecedented scale, should be banned from indexing by global multidisciplinary and specialist databases. It is high time all stakeholders of science communication revised their writing, editing, and publishing strategies to produce ethical, innovative, and otherwise useful knowledge.

## DISCLOSURE

The authors have no potential conflicts of interest to disclose.

## AUTHOR CONTRIBUTION

Conceptualization: Gasparyan AY, Nurmashev B, Kitas GD. Investigation: Gasparyan AY, Nurmashev B, Udovik EE, Koroleva AM. Writing - original draft: Gasparyan AY, Kitas GD. Writing - review & editing: Gasparyan AY, Nurmashev B, Udovik EE, Koroleva AM, Kitas GD.

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