

PREDATORY JOURNALS THREATEN THE INTEGRITY OF SCIENCE

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“Greetings for the day! We wrote to you previously, but you have not responded. You’re invited to submit your manuscript to a journal [insert topic entirely not related to the work you do], and if you send us your paper now, we will publish it within 4 days. Your paper will be peer reviewed quickly and our journal has a very high Index Copernicus Impact Value. We are impatiently waiting for your response.”

Researchers unacquainted with the term “predatory journal”, may none the less experience e-mail solicitations like the (fictitious) example given above multiple times a day. These e-mails are sometimes quite non-sensical and can be riddled with spelling and grammar errors. Other times the solicitation e-mails are more professional, grammatically correct, and even mention legitimate work the recipient has recently published. We know that even senior scientists can be duped by these types of predatory journal invitations [1]. In what follows, we discuss our program of research on predatory journals and provide a commentary on what predatory journals are, what actions we feel could be taken to stop them, and a discussion of the consequences of not addressing predatory journals. Efforts to understand and address predatory journals extend well beyond considering their e-mail solicitations. Indeed, addressing the challenge of predatory journals relates to a broader effort to improve the reporting quality of research, and to ensure research is transparent, reproducible, and useable [2-4].

WHAT IS A PREDATORY JOURNAL? REACHING A CONSENSUS DEFINITION

As part of a line of research addressing predatory journals, we recently worked with an international team

SUMMARY

This paper addresses the impact of predatory journals on the integrity of science. We outline our Centre for Journalology’s recent collaborative program of research to define predatory journals, and map solutions to addressing the problems they create. We discuss stakeholders impacted by predatory journals, including the public.

including researchers, librarians, funders, publishers, and patients to develop a consensus definition of predatory journals. Without agreement within the scholarly community on the definition of a predatory journal, or how to characterize predatory journals, it is difficult to study the phenomenon. An agreed definition also serves as a starting point to develop educational outreach and support tools. In the absence of a definition we have seen the problems that can result. Consider a recent study one of us (DM) was involved in which systematically reviewed checklists to detect predatory journals. Checklists, often produced by librarians, provide ‘red flags’ to look out for when selecting a journal. Such lists have obvious appeal, but the study found that there were a total of 93 unique checklists available in the published literature, on library websites, and even on YouTube [5]. Multiple and competing lists create confusion for those looking for guidance. These findings illustrate the need for a consensus definition to develop standardized educational resources. A consensus definition is also a necessary starting point to craft meaningful publication policies that can be implemented and audited.

The consensus definition reached was: *“Predatory journals and publishers are entities that prioritize self-interest at the expense of scholarship and are characterized by false or misleading information, deviation from best editorial and publication practices, a lack of transparency, and/or the use of aggressive and indiscriminate solicitation practices.”* [6]

This definition built upon a few other studies we were involved in. The first was a scoping review of the literature on predatory journals. There are many opinion papers about predatory journals, but little of the discussion on this topic is evidence-based. Through a systematic search we identified 334 articles discussing predatory journals, of which just 38 described research studies. Using only the empirical studies, we derived a corpus of potential characteristics of predatory journals. In total, we found 109 unique characteristics, some of which were in direct conflict. For example, we extracted the following three conflicting journal characteristics: Journal article processing charges (APCs) clearly stated”; “Journal does not specify APCs”; and “Journal has hidden APCs or hidden information on APCs” [7]. As is the case with the

abundance of online checklists to identify predatory journals, this study illustrates the inconsistency in research-based descriptions of what characterizes a predatory journal.

With a synthesis of the literature conducted, we felt it cogent to present the results of this work to a broad group of stakeholders. To do so, working with a team of colleagues, we organized an international 2-day summit meeting on predatory journals. In preparation for this meeting, we conducted a Delphi survey [8] in which we surveyed summit attendees, as well as additional stakeholders, about predatory journals. This was done in an effort to narrow down potential characteristics as we worked to establish a definition. Our survey contained 18 questions and 28-sub questions, and we required 80% agreement on an item to consider consensus among the group to have been reached. The final round of the Delphi survey was conducted in person at the Summit, and ultimately led to the consensus definition stated above. An important point to stress with respect to the consensus definition developed is that it does not specify that predatory journals use a particular publication model. Some researchers confuse open access publishing with predatory publishing. While it is true that many predatory journals take advantage of the open access publication model, where it is common for journals to take in fees for accepted articles, it is conceivable for a journal to meet the definition of being predatory using another publication model.

MOVING FORWARD WITH A DEFINITION

Now that a consensus definition of predatory journals has been established, we need to operationalize the definition in a way that is meaningful and practical for the research community. We will need to agree upon the metrics used to represent the four characteristics: (1) false or misleading information; (2) deviation from best editorial and publication practices; (3) a lack of transparency, and (4) the use of aggressive and indiscriminate solicitation practices. It may be that multiple measures are combined for each of these four characteristics, and that we could create a composite overall score for a given journal. Some characteristics will be easier to assess than others. For example, the fourth characteristic ‘use of aggressive and indiscriminate solicitation practices’ may not be easy to measure when viewing a journal website but may be a useful characteristic to consider when you receive an e-mail invitation to submit an article from a journal, such as the one at the beginning of this paper.

An interesting challenge in operationalizing the four agreed characteristics of predatory journals is that even journals considered to be legitimate and of high quality tend not to operate particularly openly or transparently. For the most part editorial and peer review still takes place in a black box. While some journals have adopted an open peer review system where authors and reviewers are known to one another and reviews are posted alongside the published paper, this is unfortunately not the norm. Further, there is little transparency, even at journals that post reviews with published work, about the

decision-making and review process related to work that the journal rejects. Changes in the scholarly landscape are in an ongoing flux; as change occurs, the metrics used to assess predatory journals, and the consensus definition itself, will require reviewing.

In addition to agreeing on a consensus definition of what a predatory journal is, attendees at our Predatory Journal Summit created a roadmap of actions they agreed would be useful in addressing predatory journals. Actions include a ‘one-stop-shop’ website of resources on predatory journals. This would host materials such as summary documents of the definition, educational resources, policy guides, and non-technical summaries. In recognition of the global nature of the threat, and the importance of raising awareness and educating a diverse group of scholars, where possible translations of all resources developed and hosted in the one-stop-shop will be created. We are also working to develop a digital journal authenticator tool. Our vision for this tool is that it could be downloaded as a plug-in, and that when a user is viewing a journal website, they could click on the tool to obtain information about it, and whether it meets the consensus definition of ‘predatory’ or not. To develop the tool, we would employ a user-centered design strategy, in which stakeholders work interactively to develop a tool that meets their needs [9,10]. Our hope is that this tool could safeguard researchers and members of the public, as well as other stakeholders, from interactions with these journals and the low-quality information they may contain.

A NOTE ON JEFFREY BEALL AND ON PREDATORY JOURNAL LISTS

The term “predatory journal” was coined by Jeffrey Beall. Beall, who worked as a librarian at the University of Colorado-Denver, identified dubious journals in the scholarly landscape that he felt preyed upon researchers in an effort to make money from publishing their articles. He subsequently began curating a list of suspected predatory journals and a list of suspected predatory publishers on his personal blog website [11]. Beall played a significant role in increasing awareness of predatory journals. We benefited from using Beall’s lists in several of our research studies. However, Beall’s lists faced several criticisms, including the methods he used to identify and evaluate journals [12]. Beall was also criticized for his bias towards journals from the global south which may have fewer resources to support publishing [12].

At first glance, the idea of a list of ‘bad’ journals to avoid is appealing. It provides a practical tool for stakeholders, such as researchers, to reference when selecting a journal to publish in. In practice, we can’t see how such lists would ever substitute for direct journal evaluation. One concern is that journal practices change over time, another is that new journals are created all of the time. How would a list of supposed legitimate journals respond to these temporal changes? How would new journals, which are often not indexed, even be identified? It would seem

that as soon as a ‘bad’ journal list was created, that it would need updating. A study by Strinzl and colleagues [13] showed that there was overlap between apparent lists of ‘good’ and ‘bad’ journals, and inconsistency within various ‘good’ and ‘bad’ lists. Based on these and other concerns, we favor the development of the aforementioned journal authenticator tool as a means to identify predatory journals.

WHAT ARE THE CONSEQUENCES OF FAILING TO ADDRESS PREDATORY JOURNALS?

The advent of predatory journals has created a novel threat to the integrity of science. This threat mirrors related societal concerns about the nature of truth such as uncertainties about the production and impact of ‘fake news’. Predatory journals sow confusion and draw scrutiny on the scientific system itself. The analogy of an evolutionary arms race is appropriate: as stakeholders impacted by predatory journals adapt to thwart their impact, the self-interested predatory journals create counter-adaptations. The threat is discipline agnostic. While there may be nuances in natural sciences that differ from our own area of biomedicine, we feel that a concerted action to address the overall phenomena is the best way forward. For example, physical sciences have a long history of use of preprints; in medicine this practice is only really beginning. With implementing preprints in medicine, there may be unique ethical considerations not pertinent to physical sciences, such as considerations of potential harms to patients related to disseminating unvetted health research. We can nonetheless learn from actions taken across various disciplines to recalibrate and challenge existing norms in publishing in order to take actions that promote responsible scholarly communication. Addressing the problem of predatory journals will require funding to understand how the journals operate and who publishes in them. Work we and others have conducted surveying authors who have published in predatory journals suggests diverse motives, and diverse experiences among authors of presumed predatory articles [14,15]. Collaborative efforts to develop and implement standardized tools, resources, and policies need to be undertaken.

Failure to address predatory journals means they will continue to erode the integrity of scholarly publishing. The impact of predatory journals is multi-faceted and effects diverse stakeholders [16]. From a researcher perspective, predatory journals pollute the scholarly landscape with journals and articles that are unlikely to meet expected best practice standards. This requires additional effort from researchers to carefully vet journals they are considering submitting to, or articles they are considering reading, using, peer reviewing or citing. The onus should be placed on genuine journals and publishers to increase their transparency and practices to facilitate journal evaluation. Errors in journal assessment contribute to waste and inadequate communication. This issue is of a global nature: counter to the prevailing view that predatory journals are a problem only in lower income nations, work we conducted with colleagues suggest that researchers all over the world are

publishing in predatory journals, including in high income nations [17]. A recent preprint reported that predatory journals tend not to be cited as much as legitimate journals [18]. Based on their analysis the authors concluded that predatory journals therefore have very little impact. This conclusion is problematic for a number of reasons. Though we would not expect predatory journals, which are not always indexed, to obtain as many citations, this is a poor assay to their overall potential impact. Further, when legitimate work ends up in predatory journals [1], if it is not found, read, and cited, this contributes to publication bias. The conclusion that predatory journals have little impact based upon low citations also fails to consider how stakeholders beyond researchers are negatively impacted by predatory journals. For example, funders presumably do not want to support work that ends up in predatory journals. This work is unlikely to be optimally disseminated as it is often not indexed. This contributes to fiscal waste, often paid from tax dollars. We anticipate that the amount of money that is spent on conducting and publishing work in predatory journals will continue to increase unless actions are taken to stop predatory journals. When one considers spending globally, this is not an insignificant amount of money. An estimate from Italy suggest that about 5% of Italian scholars CVs contain predatory publications [19].

Like funders, research institutions presumably do not want to promote publishing in predatory journals. However, if institutions consider number of publications as a metric in hiring or promotion, they may inadvertently reward predatory publishing. Some institutions require a minimum number of publications as part of doctoral training. This is increasingly recognized as a perverse system that results in predatory publishing and that does not support high quality research [20]. Ongoing reconsideration of the system of rewards and incentives used in academia is an essential action to minimize publications in predatory journals. If metrics like transparency, reproducibility, and reporting quality were valued in academia, predatory journals would be less attractive to those knowingly publishing in these outlets.

Finally, and perhaps most importantly, predatory journals have the potential to create negative consequences for the public. In our own area of biomedical research, there is the potential for unvetted predatory journal publications to end up in the hands of the public, or their care providers, and for them to use this information to inform health care decisions [21]. As researchers we feel we have the responsibility to make research openly available and accessible to the public and to communicate the issue of predatory journals. Our experience including patient partners in our research on predatory journals has very much enriched our perspective and approach to measuring and addressing this phenomenon. More broadly, predatory journals may negatively impact the public’s perception of science or lead to questions about the scientific system itself. Predatory journals may contribute to the misinformation that leads portions of the public to express skepticism towards science.

REFERENCES

1. K. Cobey, "Illegitimate journals scam even senior scientists", *Nature*, **549**(7670), (2017). doi:10.1038/549007a.
2. D. Moher, P. Glasziou, I. Chalmers, *et al.*, "Increasing value and reducing waste in biomedical research: Who's listening?", *Lancet*, **387**(10027), 1573-1586 (2016). doi:10.1016/S0140-6736(15)00307-4.
3. I. Chalmers, P. Glasziou, "Avoidable waste in the production and reporting of evidence", *Lancet*, **374**(9692), 786 (2009). doi:10.1016/S0140-6736(09)61591-9.
4. P. Glasziou, D.G. Altman, P. Bossuyt, *et al.*, "Reducing waste from incomplete or unusable reports of biomedical research", *Lancet*, **383**(9913), 267-276 (2014). doi:10.1016/S0140-6736(13)62228-X.
5. S. Cukier, R. Helal, D.B. Rice, *et al.*, *Checklists to Detect Potential Predatory Biomedical Journals : A Systematic Review*. 2019. doi:10.1101/19005728.
6. A. Grudniewicz, D. Moher, K.D. Cobey, *et al.*, "Predatory journals: no definition, no defence", *Nature*, **576**, 210-212 (2019).
7. K.D. Cobey, M.M. Lalu, B. Skidmore, N. Ahmadzai, A. Grudniewicz, D. Moher, "What is a predatory journal? A scoping review", *F1000Research*, **7**(3), 1001 (2018). doi:10.12688/f1000research.15256.1.
8. S. Cukier, M.M. Lalu, G.L. Bryson, K.D. Cobey, A. Grudniewicz, D. Moher, "Defining predatory journals and responding to the threat they pose: a modified Delphi consensus process", *BMJ Open*. <https://bmjopen.bmj.com/content/10/2/e035561.abstract>.
9. D.A. Norman, S.W. Draper. *User Centered System Design*. Hillsdale, NJ: Lawrence Earlbaum Associates, 1986.
10. A.H.O. Witteman, G. Vaisson, T. Provencher, *Development and Validation of UCD-11 : An 11-item Measure of User-Centered Design for Patient-Centered Tools* Abstract (300 words). *OSF Prepr*, 7-27.
11. J. Beall, "Predatory publishers are corrupting open access", *Nature*, **489**, 179 (2012).
12. M. Berger, J. Cirasella, "Beyond Beall's list", *Coll Res Libr News*, 132-135 (2015). <http://crln.acrl.org/content/76/3/132.full.pdf+html>.
13. M. Strinzel, A. Severin, K. Milzow, M. Egger, "'Blacklists' and 'whitelists' to tackle Predatory Publishing: a Cross-Sectional Comparison and Thematic Analysis", *MBio*, **10**(3), 1-16 (2019). doi:10.7287/peerj.preprints.27532v1.
14. K.D. Cobey, A. Grudniewicz, M.M. Lalu, H. Raffoul, D. Moher, D.B. Rice, "Knowledge and motivations of researchers publishing in presumed predatory journals : a survey", *BMJ Open*, **e026516**, 1-9 (2019). doi:10.1136/bmjopen-2018-026516.
15. S. Kurt, "Why do authors publish in predatory journals?", *Learn Publ*. **31**(2), 141-147 (2018). doi:10.1002/leap.1150.
16. M.M. Lalu, L. Shamseer, K.D. Cobey, D. Moher, "How stakeholders can respond to the rise of predatory journals", *Nat Hum Behav*. **1**(12), (2017). doi:10.1038/s41562-017-0257-4.
17. D. Moher, L. Shamseer, K. Cobey, *et al.*, "Stop this waste of people, animals and money", *Nature*, **549**(7670), (2017). doi:10.1038/549023a.
18. B.-C. Björk, S. Kanto-Karvonen, J.T. Harviainen, "How Frequently are Articles in Predatory Open Access Journals Cited", *Preprint*. 1-16 (2019). <http://arxiv.org/abs/1912.10228>.
19. M. Bagues, M. Sylos-Labini, N. Zinovyeva, *A Walk on the Wild Side: An Investigation into the Quantity and Quality of 'Predatory' Publications in Italian Academia*. Pisa, Italy, 2016.
20. B. Patwardhan, "India strikes back against predatory journals", *Nature*, **571**, 7 (2019).
21. M.M. Lalu, "Predatory journals prey on public and patients", *Naked Sci*. 2017. <https://www.thenakedscientists.com/articles/science-features/predatory-journals-prey-public-and-patients>.