



## Review article

## Editorial misconduct: the case of online predatory journals

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## ABSTRACT

The number of publishers that offer academics, researchers, and postgraduate students the opportunity to publish articles and book chapters quickly and easily has been growing steadily in recent years. This can be ascribed to a variety of factors, e.g., increasing Internet use, the Open Access movement, academic pressure to publish, and the emergence of publishers with questionable interests that cast doubt on the reliability and the scientific rigor of the articles they publish.

All this has transformed the scholarly and scientific publishing scene and has opened the door to the appearance of journals whose editorial procedures differ from those of legitimate journals. These publishers are called *predatory*, because their manuscript publishing process deviates from the norm (very short publication times, non-existent or low-quality peer-review, surprisingly low rejection rates, etc.).

The object of this article is to spell out the editorial practices of these journals to make them easier to spot and thus to alert researchers who are unfamiliar with them. It therefore reviews and highlights the work of other authors who have for years been calling attention to how these journals operate, to their unique features and behaviors, and to the consequences of publishing in them.

The most relevant conclusions reached include the scant awareness of the existence of such journals (especially by researchers still lacking experience), the enormous harm they cause to authors' reputations, the harm they cause researchers taking part in promotion or professional accreditation procedures, and the feelings of chagrin and helplessness that come from seeing one's work printed in low-quality journals. Future comprehensive research on why authors decide to submit valuable articles to these journals is also needed.

This paper therefore discusses the size of this phenomenon and how to distinguish those journals from ethical journals.

## 1. Introduction

Completing a rigorously designed scientific study in a researcher's field entails a huge investment in time and effort, and deciding where to publish the results is of the utmost importance, since the study's visibility, ease of access, and effect on the researcher's reputation will depend on the medium used. On the surface that decision would seem to be an easy one given the large number of journals that are published today. In fact, it is anything but, because not all journals have the same ethical principles and publishing policies. A sound knowledge of a journal, the indicators of the quality of its editorial practices, the databases that index it, and its code of ethics is indispensable to be able to appraise it and decide whether to submit a manuscript.

The field of academic and scientific publishing has unquestionably changed greatly in recent years, and the Internet has had a huge impact on the changes that have taken place (Lugo-Mata, 2018). The web has given rise to the creation of scientific journals, many of which are now published only online (Shen and Björk, 2015; Richtig et al., 2018), and it has contributed to rapid dissemination of knowledge. At the same time, the Open Access (OA) movement has arisen in an effort to ensure unrestricted access to research results, do away with intermediaries, and shift publishing costs from authors onto the journals (Jiménez-Contreras and Jiménez-Segura, 2016).

That movement began in around the year 2000 in response to unfair commercial policies by some publishers (Silva, 2018), and its emergence has been positively received by part of the academic and scientific community, because it allows studies to be accessed without having to

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pay subscription fees or fees to download articles, and at the same time Open Access is a boon to research opportunities in the less well-developed countries (Jiménez-Contreras and Jiménez-Segura, 2016).

Seeing the benefits that OA brings, there seemed to be little reason to suspect that some unprincipled publishers might take advantage of the situation to turn the movement into a money-making operation. So it was that predatory journals came about. These journals do not provide the editorial services that legitimate journals offer, which calls into question the reliability and scientific standards of the articles they publish (Bramstedt, 2020). They aggressively recruit authors, reviewers, and members of their scientific boards using dubious tactics, and their publishing procedures are far from transparent. Let it be said that this description is not meant to suggest that all open access journals are predatory. There is certainly a long list of journals that can be read for free yet nonetheless uphold high scholarly and scientific standards (Alonso et al., 2020). This is precisely what makes being able to identify journals that are predatory so important.

The emergence of these journals has been described by some authors as being predatory in nature, a threat to scientific integrity (Abad-García, 2019), a form of robbery (Bramstedt, 2020), an epidemic (García-Puente, 2019) and, indeed, even a pandemic (Kebede et al., 2017, as cited in Lugo-Mata, 2018). The way they go about attracting their clientele is certainly controversial, using guile to strategically exploit the intellectual property of others and debasing responsible publishing.

Accordingly, this article draws on the previous literature that has dealt with these developments to help spot journals of this kind and keep them from spreading by alerting uninformed researchers about these journals' editorial practices. It is therefore intended to take work done by authors and experts who over the years have examined how these journals operate, what sets them apart, and the consequences of publishing in them and put it to practical use. This review will serve as a basis for considering the size of this phenomenon and how to keep journals like these from being conflated with journals that operate to ethical standards.

## 2. Background

### 2.1. "Predatory journals": what are they?

Many authors define "predatory journals" as journals that exploit the OA model unprofessionally to derive economic gain without meeting the quality standards of scientific publications (Bertoglia and Águila, 2018; Cobey et al., 2019; Boukacem-Zeghmouri et al., 2020). According to Jiménez-Contreras and Jiménez-Segura (2016), their basic profile can be summarized as a generalist journal operating out of an Asian country (and electronic headquarters in the United States) that promises international visibility with overly short acceptance, review, and publication times. These features are indicators of an atypical editorial model. Also, quick publication at an affordable price is an incentive to many authors who value immediacy as a means of expediting the dissemination of the results of their research.

Scientific output is virtually the sole basis for promotion for university faculty members (Bertoglia and Águila, 2018), and predatory journals have singled out that need and turned it into a business model that yields lucrative profits by making publishing space available and pulling the wool over the eyes of naive authors. Publishers of this kind can be spotted by how they go about attracting potential customers and by the clever communications ploys they use to sell their "publishing dreams". They have been referred to as "predatory" because they put themselves forward by sending out bulk mailings of e-mails (Moher and Srivastava, 2015) in which they hold themselves out to researchers as publications with worldwide impact.

The magazine *Nature* (Grudniewicz et al., 2019) published a good definition of the term, considered to be one of the fullest, put forward by a group of scholars and editors from different countries:

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.

That definition highlights key features of their business practices and makes it clear that what drives them is their own commercial self-interest, not any actual interest in science. The adjectives "false", "misleading", "aggressive", and "indiscriminate" refer to practices that are not above-board, that deviate from those of legitimate publishers. Furthermore, their operations tend to lack transparency, an aspect included in certain authors' definitions. For instance, Mercado (2017) noted that these journals are characterized by "fast review procedures that lack transparency" (p. 102). Jiménez-Contreras and Jiménez-Segura (2016) in their turn pointed out that these journals exhibit "a lack of transparency in their publishing operations" (p. 9), and Castro-Martínez et al. (2019) observed that "they are characterized by having several layers of deceit" (p. 3). Estrada and Gallegos (2021) noted that "they are run by predatory publishers who are dishonest and lack transparency" (p. 182) and ethics.

These evaluations cast doubt on their commitment to integrity, taken in this context to be "the active adherence to the ethical principles and professional standards essential for the responsible practice of research" (Korenman, n.d., as cited in Abad-García, 2019, p. 57.e6). This commitment needs to be made by everyone with an interest in advancing science and disseminating knowledge. It is something that is not to be taken lightly or distorted, let alone infringed.

While certain authors have held that there is no clear definition of predatory journals (Khan and Moher, 2017; Cobey et al., 2018), in point of fact they are all poor-quality open access publications. The term was coined in 2010 by Jeffrey Beall, Scholarly Initiatives Librarian at the University of Colorado Denver (Richtig et al., 2018; Bramstedt, 2020). However, some authors (Anderson, 2015; Shen and Björk, 2015; Wager, 2017), dissatisfied with the negative connotations attaching to this term, have suggested that it should no longer be used, because it does not accurately describe journals that do not live up to professional publishing standards (through lack of experience, resources, or infrastructure) but do not deliberately set out to deceive. That is, they do not publish just anything to be able to collect article processing charges (APCs).

Lastly, to avoid using reductionist terminology when referring to this type of journal – e.g., phony publishers (Castro-Martínez et al., 2019), deceptive businesses (Beall, 2010), fraudulent free-rider journals (Jiménez-Contreras and Jiménez-Segura, 2016), questionable journals (Lugo-Mata, 2018) or pseudo-journals (Shen and Björk, 2015) – one reasonable option might be to speak of journals that exhibit standard and non-standard behavior as proposed by the Agencia Nacional de Evaluación de la Calidad y Acreditación [National Agency for Quality Assessment and Accreditation of Spain] (ANECA) in the recently published report, *Análisis bibliométrico e impacto de las editoriales Open Access en España* [Bibliometric impact assessment of Open Access publishers in Spain] (2021).

## 3. Methodology

### 3.1. How to spot a journal that exhibit non-standard behavior

Analyzing opportunistic behavior by predatory journals is a challenge for many, but some strictly bibliometric indicators, namely, the Impact Factor (IF), the Impact Factor minus Author Self-Citation (IF<sub>asc</sub>), and the Article Influence (AI) score, can help researchers rate a journal's quality and ascertain whether its behavior deviates from the standards of legitimate journals. Apart from these indicators, there are other criteria that can help researchers spot low-quality open access journals that rely on questionable practices. Table 1 below lists some aspects to consider before submitting manuscripts to journals that aggressively and

**Table 1.** How to spot a journal that exhibits non-standard behavior.

Journal title and location	<ul style="list-style-type: none"> <li>• Somewhat misleading “fanciful titles” (Castro-Martínez et al., 2019) are used to dupe researchers into thinking that the journal has a worldwide impact and is highly reputable from a scientific standpoint.</li> <li>• The title may be quite similar to those of conventional journals and thus may be a source of deliberate confusion; titles can often be quite appealing (García-Puente, 2019) and ambitious (Richtig et al., 2018), titles that many researchers would like to see on their résumés.</li> <li>• The title of the journal is commonly unrelated to its mission and is not indicative of its actual origin (Jiménez-Contreras and Jiménez-Segura, 2016). There are journals whose titles include such country or regional names as “Canadian”, “American”, “British”, or “European”, but neither the publisher nor any of the affiliated institutions have any connection to those countries (Jiménez-Contreras and Jiménez-Segura, 2016).</li> <li>• Titles like these are misleading because they give the impression that they come from reputable locations (United States or Western Europe), but in many cases their offices are located in Pakistan, India, or Nigeria and hence “outside the scope of legal or regulatory systems that might oversee or limit their operations” (Bertoglia and Águila, 2018, p. 209).</li> <li>• Journal titles may encompass a broad range of subject areas, enabling them to publish articles on many topics (Segarra-Saavedra et al., 2020).</li> <li>• Some journals do not disclose their locations or list false postal addresses (Bramstedt, 2020; Taylor, 2021), incorrect or unprofessional contact details (e-mail addresses with Gmail, Yahoo or Hotmail domains), preventing contact with the editor.</li> <li>• The logos of these journals may resemble those of other reputable journals (Richtig et al., 2018).</li> </ul>
Editorial Board	<ul style="list-style-type: none"> <li>• The editor-in-chief is listed as the editor for all or many of the publisher's journals (Jiménez-Contreras and Jiménez-Segura, 2016).</li> <li>• Editors may be bogus, e.g., may not exist (Richtig et al., 2018), or may be non-professionals (Cobey et al., 2018; Oviedo-García, 2021).</li> <li>• Some journals have too few (just 2 or 3) members on the editorial board, members may be included on the boards without their knowledge, or board member affiliation may be unverifiable (Taylor, 2021).</li> <li>• The geographical location of board members may be clustered, which is a red flag, because if a journal specializing in a specific field of study is purportedly international in scope, it is odd for that reach not to be reflected in its board members.</li> </ul>
Editorial, publishing, and article storage practices	<ul style="list-style-type: none"> <li>• They publish all papers received without providing robust peer-review to ensure scientific quality of the articles submitted (Khan and Moher, 2017; Memon, 2019; Bramstedt, 2020).</li> <li>• There is an obvious lack of transparency in the manuscript editing process (Estrada and Gallegos, 2021).</li> <li>• The digital storage policy is not stated, and researchers therefore do not know what will happen to their manuscripts if the journal closes down.</li> <li>• Article review protocols receive only cursory mention to give the appearance being compliant with standards.</li> <li>• The services provided are not what would be expected from a legitimate scientific journal: poor or non-existent blind peer review, papers are poorly copy-edited (Richtig et al., 2018) with no regard to their content and structure (García-Puente, 2019) and no customer service is offered, either.</li> <li>• Manuscript submission is done by e-mail instead of by professional systems (Richtig et al., 2018).</li> <li>• Publication times are very short, just a few days or weeks go by from when a paper is sent in to publication (Asadi, 2019; García-Puente, 2019; De la Blanchardière et al., 2021).</li> </ul>
Communication strategies	<ul style="list-style-type: none"> <li>• Contact between the journal and the researcher is handled by e-mail; spam e-mails are sent out in bulk to new researchers (Moher and Srivastava, 2015; Teixeira da Silva et al., 2020), who are identified by conducting searches in institutional repositories and scientific journals that have published their initial articles.</li> <li>• The journal makes use of business advertisement terminology and even offers special discounts (Cobey et al., 2018).</li> <li>• Manipulative language is used to praise author's previous published articles and invite participation on their scientific boards or special issues of the journal (Bertoglia and Águila, 2018).</li> <li>• The journal promises fast-track publication at affordable cost.</li> <li>• It boasts of a high publication rate.</li> <li>• Both the number of journals issued by the publisher and closely similar designs used are suspect.</li> <li>• Inadequate information on publishing costs is provided and held back until the proposal has been accepted. Afterwards, authors are charged in a rather aggressive tone (Bertoglia and Águila, 2018).</li> <li>• The journal's website or solicitation e-mails are unprofessional, contain spelling, typographical, or grammatical errors (Richtig et al., 2018; Bramstedt, 2020) and distorted or unauthorized images (Alonso et al., 2020). Broken links are commonplace.</li> <li>• They use web crawling to assemble their distribution lists (Khan and Moher, 2017).</li> </ul>
Visibility and impact	<ul style="list-style-type: none"> <li>• The journal claims to be indexed in a series of major databases (Web of Science, Scopus, Medline, Embase, etc.) (Boukacem-Zeghmouri et al., 2020) and to have a high impact factor, but that information cannot be found on its website.</li> <li>• Attractive but false impact metrics are provided.</li> <li>• The impact factors are furnished by companies with brands that suspiciously resemble the originals (<i>Global Impact Factor</i>, <i>International Scientific Indexing</i> (ISI), etc.) (Jiménez-Contreras and Jiménez-Segura, 2016), and are not in consonance with the standard for the field (Journal Citation Reports, JCR).</li> <li>• The journal does not have an ISSN, other times the ISSN is fake.</li> <li>• Published articles are not disclosed by standard searches in reputable databases, and as a result they are not disseminated and largely go unread and uncited (Khan and Moher, 2017).</li> <li>• The journal is not affiliated to any organization or university (Cobey et al., 2018; Memon, 2019).</li> </ul>
Transparency and scientific integrity policies	<ul style="list-style-type: none"> <li>• Insufficient resources are expended on preventing and eliminating author misconduct.</li> <li>• The publication has no clear ethics policy (COPE, 2019).</li> <li>• The procedures used to identify possible research deficiencies are not stated (COPE, 2019).</li> <li>• Cases of plagiarism or mishandling of data, images, tables, and the like can be found repeatedly in the journal's published articles. In fact, many of its manuscripts are actually originals previously published in legitimate journals (Cobey et al., 2018), and sometimes the authors themselves are not even aware that their articles have been copied (García-Puente, 2019).</li> <li>• The journal lacks policies concerning data integrity, authorship and copyright, retraction and correction, informed consent, research ethics, committee approval, and conflicts of interest (Bramstedt, 2020).</li> <li>• Publication fees are hidden or not stated on the website, and disclosed only after the paper has been accepted (Cobey et al., 2018; Richtig et al., 2018). Costs range between USD 100 and USD 400 (Jiménez-Contreras and Jiménez-Segura, 2016), that is, lower than those for a legitimate open access journal (between USD 800 and USD 2,205) (Shamseer et al., 2017, as cited in Taylor, 2021).</li> <li>• These publications disregard normative behavior and are prone to unethical conduct (Khan and Moher, 2017).</li> </ul>

Source: compiled by the author based on the literature review.

intrusively solicit submissions. These aspects have been grouped into six categories on the basis of a review of the current literature (Moher and Srivastava, 2015; Jiménez-Contreras and Jiménez-Segura, 2016; Khan and Moher, 2017; Bertoglia and Águila, 2018; Cobey et al., 2018; Richtig et al., 2018; Asadi, 2019; Castro-Martínez et al., 2019; Committee on Publication Ethics (COPE), 2019; García-Puente, 2019; Memon, 2019;

Alonso et al., 2020; Bramstedt, 2020; Boukacem-Zeghmouri et al., 2020; Segarra-Saavedra et al., 2020; Teixeira da Silva et al., 2020; De la Blanchardière et al., 2021; Estrada and Gallegos, 2021; Oviedo-García, 2021; Taylor, 2021) and the author's own experience as a researcher:

Most of these aspects have also been observed by other authors who have empirically studied the behavior of journals of this kind. For

example, [Shen and Björk \(2015\)](#) assessed the behavior of 613 journals on Beall's list for the period 2010–2014 and identified an enormous upsurge in the number of articles they published (from 53,000 in 2010 to 420,000 in 2014). Three-fourths of the authors of these articles were from Asia and Africa, and articles were published two or three months after submission.

In turn, Djuric (2015, as cited in [Shen and Björk, 2015](#)), described the pressure placed on academics and researchers in Serbia, where the government required them to publish in high impact factor journals, doctoral candidates included. This resulted in a niche market for certain local publishers, “which have managed to get their journals into Web of Science, in the wake of Thomson Reuter's drive to index more regional journals during the latter half of the previous decade” ([Shen and Björk, 2015](#), p. 2).

Furthermore, [Shamseer et al. \(2017\)](#) looked at three types of journals (93 classified as predatory, 99 as Open Access, and 100 as subscription based) and performed a comparative analysis on the three models. One of their main conclusions was how predatory journals contacted potential authors by e-mail and aggressively solicited manuscripts, a practice that legitimate journals did not follow. This idea is consistent with the results published by [Kozack et al. \(2015\)](#), who performed an assessment on the e-mails received by Dr. Marcin Kozak in 2012 and 2013. The authors examined 1,024 spam e-mails sent by publishers and journals and found that 70% of them were on Beall's list. Many publishers and journals sent out up to forty calls for papers over the year the study lasted.

[Shamseer et al. \(2017\)](#) also analyzed article processing charges, which were lower than those of legitimate journals (from USD 63 to USD 150), a figure that was quite close to the charges reported by [Shen and Björk \(2015\)](#), who found that on average the journals they looked at charged USD 178 per article.

These and many other studies ([Repiso et al., 2021](#); [Siler, 2020](#); [Spezi et al., 2017](#)) have disclosed the rapid growth experienced by this publishing market development and have called attention to a business model that thwarts the purpose of Open Access and is seriously detrimental to researchers. As long as researchers continue to send these publishers their manuscripts, the problem not only will continue to exist but, what is more worrying, will grow even more widespread.

#### 4. Factors affecting decisions to publish in these journals

Based on the conclusions in the literature reviewed for this article, the decision to publish in these journals depends on both intrinsic and extrinsic factors. All the communication, visibility, impact, publishing, and other strategies described above are ploys to increase profits “at the expense of scholarship” (according to the definition published in *Nature*), that is, they are intrinsic factors. Now the time has come to turn our attention to factors that are extrinsic to this business.

The first factor to consider is a misperception of the risks that attach to publishing in these journals ([Castro-Martínez et al., 2019](#); [Cobey et al., 2019](#); [Memon, 2019](#)). Many authors are not cognizant of the repercussions that may ensue from sending manuscripts to these unscrupulous publishers and thus becoming victims of this false publishing game. They do not realize that their reputation as researchers and their opportunities for promotion are at stake ([Alonso et al., 2020](#)). Furthermore, they overlook the fact that they could be accused of unethical publishing and even suffer the loss of legitimate data and research results ([Oviedo-García, 2021](#)). Nevertheless, all researchers know that they are responsible for assessing the sources in which they decide to publish and for checking whether those sources meet minimum quality standards. In consequence, they need to consider these risks more thoroughly.

This widespread unawareness among researchers has been studied by authors like [Castro-Martínez et al. \(2019\)](#), who surveyed the degree of awareness of publishing using predatory publishers and predatory journals in 238 practitioners in the fields of Social Science and Medicine. The survey results gave some cause for concern: 83.61% of the sample was

unaware of the existence of this business, a not insignificant percentage that raises questions related to publishing ethics.

Along these same lines, [Shen and Björk \(2015\)](#) found that there was a certain degree of complicity on the part of authors, who knowingly take part in and acquiesce in the abuses carried out by these publishers. In their view, many authors who submitted their manuscripts were “well aware of the circumstances and take a calculated risk that experts who evaluate their publication lists will not bother to check the journal credentials in detail” (p. 14). This makes them not victims but accomplices in a business that undermines the credibility of scientific output and engages in the doping of academic careers ([Oviedo-García, 2021](#)).

Those same authors' findings indicated that stringent internal evaluation procedures and requirements to publish in international journals whatever the cost, causes institutions and funding agencies in some countries to focus on publishing frequency or the outlet used instead of on the significance of the results and the contribution to the scientific community. [Shen and Björk \(2015\)](#) observed that some authors and institutions “are part of a structurally unjust global system that excludes them from publishing in 'high quality' journals on the one hand and confines them to publish in dubious journals on the other” (p. 14). The rapid spread of these journals calls for reviewing internal evaluation and promotion policies and toughening the quality standards of open access journals that apply to be included in academic and scientific directories (DOAJ, Embase, Medline, SciELO, etc.).

Preventing the continued growth of journals that exhibit non-standard behavior will be difficult in the short term, especially if the legal measures required to punish these practices are not taken, and the publishers concerned are not required to comply with certain minimum ethical principles and publishing standards. Only in this way will it be possible to avoid “career impairment” ([Alonso et al., 2020](#)) or scientific impairment before it is too late.

#### 5. Conclusions, recommendations, and outlook

Today, journals that exhibit non-standard behavior pose a threat to scholarly and scientific integrity ([Abad-García, 2019](#)). Their growth is skyrocketing ([Shen and Björk, 2015](#)), which indicates that there is a business niche that makes them profitable. Ostensibly their interest should be to disseminate knowledge, but in fact their aim is to benefit from unmindful researchers who find themselves under constant pressure to publish.

There is thus a need for articles like this one, to bring attention to this worrisome situation and provide an opportunity to reflect on objectionable publishing practices. This, then, is the *raison d'être* for the objectives stated at the outset of this article, namely, putting the existing scientific literature to use to help spot journals of this kind and warn uninformed researchers about their editorial practices.

In fact, this predatory phenomenon has now grown to a size where it no longer concerns itself just with fast-track publishing of pseudo-scientific articles but has branched out to holding fake conferences or predatory meetings that offer authors the opportunity to publish their presentations as chapters in a book ([Asadi, 2019](#); [Oviedo-García, 2021](#)). Where a presentation is signed by multiple authors, each one must pay a pricey registration fee, certainly a source of lucrative profits for the publishers.

Over time, these questionable practices mutate into new forms of fraudulent research-connected behavior. For instance, attention has recently been drawn to the existence of what are known as “research manuscript shops”, e.g., portals where authorship of a research article for publication in real journals indexed in Web of Science or Scopus can be purchased. One such website is 123mi.ru (Bogorov, 2019; as cited in [Alonso et al., 2020](#)). The services provided include selling whole single authorship of articles, selling partial authorship of articles (co-authorship), and auctioning off scientific articles. That website boasts that more than 4,000 articles have been published in major databases in the past five years and that it is the sole business operating in the market that is capable

of handling up to 400 articles a month. Services are hired on the Internet, but receipt of payment is sent by WhatsApp, Viber, or e-mail. Prices are quoted in Russian rubles, and the advertiser itself says that “services are not cheap because publication and indexation are fully guaranteed, [but] where others make promises, take the money, and run, [they] produce quality articles and publish and index them 100% of the time”. These illicit businesses were unthinkable just a few years ago, hence a fast and firm response is needed to halt the operation of these fraudulent activities so that they do not ultimately tarnish scientific discourse.

Several recommendations can be made:

- First, distrust solicitations to publish sent by e-mail (García-Puente, 2019). Reputable journals do not repeatedly solicit the submission of manuscripts by e-mail, let alone promise fast-track publication without stringent peer-review.
- Consult senior researchers, supervisors, mentors, librarians, or other members of the research group before responding to any electronic invitation from or submitting an article to a potentially predatory journal (Khan and Moher, 2017)
- Check whether the journal where the manuscript is to be published has been included on a checklist like the ones released by Beall, Cabell, or Blobaum, which set out criteria that can be used to spot journals with non-standard practices, a good starting point for ascertaining whether a journal might be dubious in nature (Khan and Moher, 2017).
- Check the real impact factor index and whether the journal is indexed in a reference database (Web of Science, Scopus, Medline, etc.).
- Check the information listed on the website (name, location, time in existence –most are recent–, editorial board, digital storage policy, editorial standards, publication procedure, plagiarism prevention systems, ISSN, DOI, rejection rate, and so forth).
- Check the journal's copyright assignment policy and whether authors have to bear the cost of publication.
- Carefully examine the journal's formal appearance (logo, images published, the spelling and grammatical accuracy of the wording used, etc.). Legitimate journals simply do not commit lapses.
- Use the resources and tools available on the web to help researchers spot these journals (e.g., Think, Check, Submit) and check the documents released by organizations that promote research integrity, such as the *World Association of Medical Editors* (WAME), the *Committee on Publication Ethics* (COPE), the *Open Access Scholarly Publishing Association* (OASPA), and the *Council of Science Editors* (CSE) to contribute to greater awareness of this phenomenon.
- Report fraudulent practices that fall outside the bounds of publishing ethics.
- Consider informing your institution about persistent email invitations received before deleting them or unsubscribing from mailing lists. Some universities or organizations maintain internal black lists of predatory journals (Khan and Moher, 2017) and each individual's personal contribution can be very helpful.
- Do not publish in these journals, do not serve on their editorial or “scientific” boards, and be averse to citing the articles they publish (Oviedo-García, 2021).
- Do not participate in any fraudulent action promoted by questionable publishers such as fake conferences, an emerging phenomenon that continues to attract adherents (Lang et al., 2019; Pecorari, 2021); or involve other colleagues to get some benefit or discount in return for taking part in them (Asadi, 2019).

These recommendations are put forward to help make researchers aware of what they can do to avoid publishing in journals of this kind. In any case, a good starting point is to set aside the compulsion to publish at any cost and instead publish only when you have something to report and then only in legitimate journals.

This study has disclosed a series of steps that could be taken to consider this question in more detail and spread awareness of this topic.

In the first place, more empirical studies to help quantify the extent of the problem are needed. Secondly, these corrupt practices should be included as a subject of study in instructor and researcher training programs. This would help limit recourse to publishers of questionable reputability to publish manuscripts. Thirdly, penalties for those who try to take credit from disreputable publications and fake congresses and for those who buy co-authorships in indexed journals need to be stiffened (Castro-Martínez et al., 2019). Finally, laws that criminalize and punish this type of conduct that is so detrimental to research ethics and integrity and stands in the way of knowledge sharing need to be passed. These actions would hasten the demise of predatory journals.

## Declarations

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The authors declare no conflict of interest.

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