

Predatory Journals: A Literature Review

Literature Review

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ABSTRACT

Background: Predatory publishing is an exploitative fraudulent open-access publishing model. Most predatory journals do not follow policies that are set forth by organizations including the World Association of Medical Editors (WAME), the Committee on Publication Ethics (COPE), the Council of Science Editors (CSE), and the International Committee of Medical Journal Editors (ICMJE). Jeffrey Beall, an associate professor at the University of Colorado Denver and a librarian at Auraria Library, coined the term 'predatory journals' to describe pseudo-journals. Our literature review has highlighted that predatory journal authorship is not limited to early-career researchers only. Majority of authors are unfamiliar with practices in pseudo journals despite publishing manuscripts.

Methodology: For the purpose of this review, a systematic literature search was carried in October 2019 of the following databases: (1) Web of Science (all databases), (2) ERIC, and (3) LISTA. All stages of the review process included access to the search results and full articles for review and consequent analysis. Articles were added after screening full-text articles by meeting the inclusion criteria and meeting none of the exclusion criteria. As there were a high number of articles reporting findings on predatory journals, they were further screened re-evaluating them for any deviations from the theme of this study. Relevant material published within the last five years was used.

Results: After a thorough review, 63,133 were located using the Boolean logic. After reviewing 63 abstracts and titles for relevance, 9 articles were included in the literature review. Four themes are concerned with the results of the synthesis that demarcate legitimate and predatory publications. They include factors: (1) Related to the journal, (2) Academic and professional, (3) Dissemination, and (4) Personal.

Conclusion: Our literature review found that there is a lack of one single definition for predatory journals. We believe that it is essential for potential authors and young researchers to have clear guidelines and make demarcations of potential journals that seem dubious. Moreover, the authors' selection of publishers should be modified to control the risks of tainting 'open-access' publishing with fraudulent journals. The academic and research community ought to revise their criteria and recognize high quality and author journals as opposed to 'predatory' journals. Research mentorship, realigning research incentives, and education is vital to decrease the impact of predatory publishing in the near future.

MeSH terms: *Predatory, Journal, Publishing, Open-Access, Author, Scholarly, Pseudo, legitimate.*

INTRODUCTION

Predatory publishing is an exploitative fraudulent open-access publishing model. With the introduction of electronic journals around the millennium shift, mainstream publishers confirm electronic licensing's role in dominating the business model.^[1] "Predatory" refers to the idea that these entities prey on scholars

for a financial profit via open-access processing charges without meeting scholarly publishing standards.^[2] Most of these journals do not follow policies that are set forth by organizations including the World Association of Medical Editors (WAME), the Committee on Publication Ethics (COPE), the Council of Science Editors (CSE), and the



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International Committee of Medical Journal Editors (ICMJE). A side effect of this transformation in the publication is the radical change in revenue models. Many innovative journals have placed focus on becoming service providers to authors rather than content publishers. The open-access model places authors as the donators that pay publishers wherein the article becomes readily available.

Jeffrey Beall, an associate professor at the University of Colorado Denver and a librarian at Auraria Library, coined the term predatory publishers to describe pseudo-journals.^[3-5] Beall compiled yearly lists of possible, potential or probably predatory open access journals from 2011 to 2017. Beall also listed concrete criteria that identified such journals with an updated index that continues to locate the pseudo-journals. Two additional lists, *hijacked journals* and *misleading metrics*, were added in 2015.^[5]

Hijacked journals refer to counterfeit websites that mimic legitimate journals to solicit submissions and collecting publication fees from authors who are misled to believe that the journal is legitimate. The misleading metrics list highlighted counterfeit impact factors and other journal measures that predatory publishers use to deceive scholars.^[6-7] However, on January 17, 2017, Beall's website was dismantled with unclear reasons. The list was alarmingly lengthy with 1294 journals enlisted as of January 3, 2017.^[5] He employed Principles of Transparency and Best Practice in Scholarly Publishing from COPE, WAME, DOAJ, and Open Access Scholarly Publishers Association (OASPA). The effort involved in formulating Beall's list was impressive, and it was a well-reasoned starting point for scholars who planned to investigate the journal's or publisher's credibility.^[4]

However, Beall did not list the specific criteria used to give these journals a status of 'predatory' and blacklisted specific journals from Low and Middle-Income Countries (LMICs) on the count of having little or no geographic diversity. Beall's biases against open access publishing models were criticized. Therefore, WAME has added cautionary measures against the use of Beall's list as the singular method to determine whether the journal is legitimate or predatory.^[5]

METHODS

Search Strategy

For the purpose of this review, a systematic literature search was carried in October 2019 of the following databases: (1) Web of Science (all databases), (2) ERIC, and (3) LISTA. The most relevant studies that were agreed by all authors were selected. The following search

items were used across the identified databases as appropriate: "Predatory"; "Pseudo;" "Predatory journals"; "Pseudo journals"; "Predatory publishers." The terms were searched in combination by using the Boolean logic (AND, OR).

Inclusion Criteria and Selection Process

The eligibility criteria for publications to be reviewed were: (1) empirical investigations in the discipline, (2) focus on predatory journal relevance to research outcomes, (3) peer-reviewed and published in the NLM database, and (4) available in English. Articles that referred to predatory and pseudo journals were thoroughly examined because the term "predatory" refers to exploitative and fraudulent money-garnering processes. All articles citing opinion pieces, editorials, and short-communications were extruded to avoid redundancy in data analysis.

Critical Appraisal

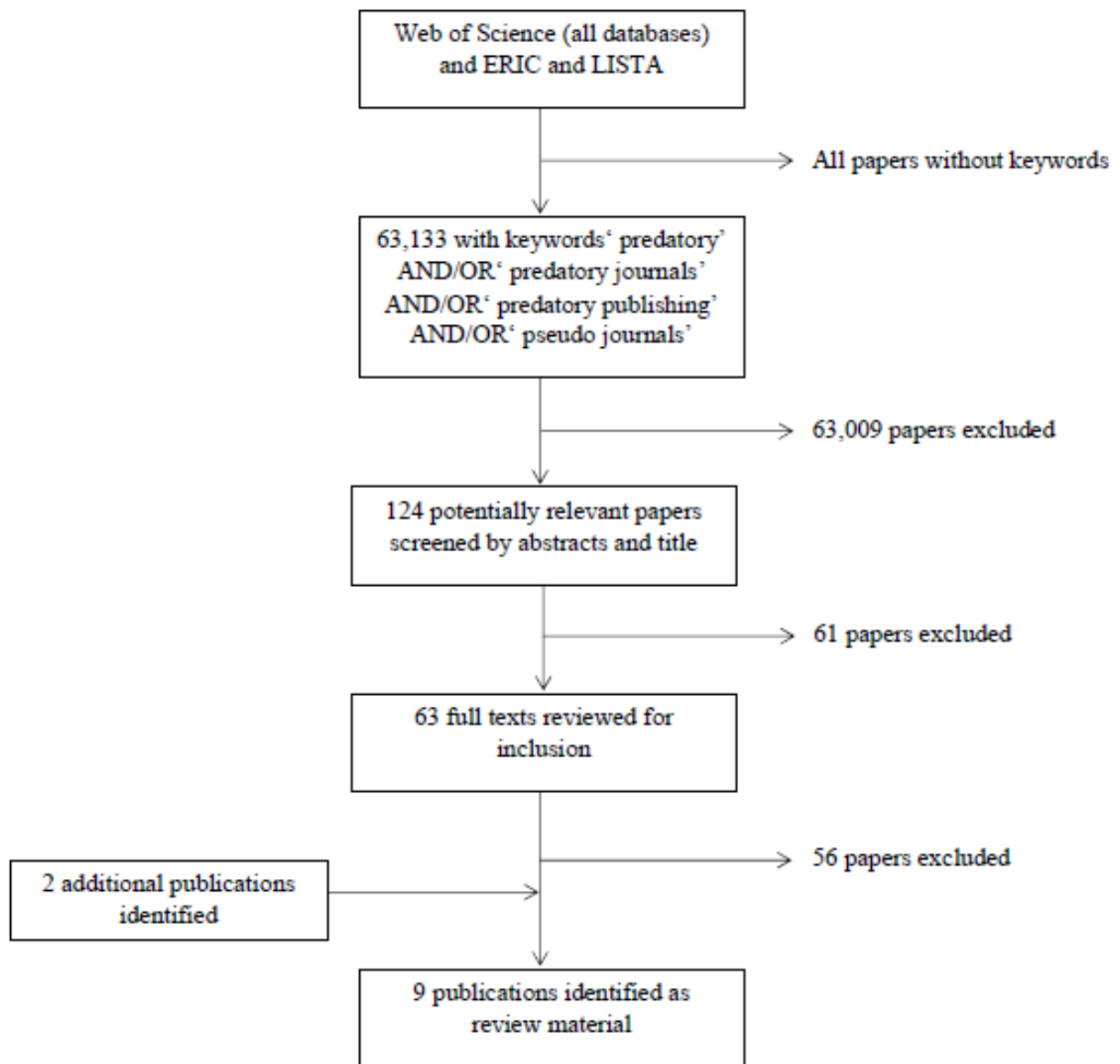
The search adhered to the process delineated in figure 1. A critical appraisal was required, and it was obtained by providing a rationale for excluded studies and the inclusion of final studies. All stages of the review process included access to the search results, full articles for review and consequent analysis. Following reviews of duplicates in the isolated databases, titles and abstracts were reviewed. Articles were added after screening full-text articles by meeting the inclusion criteria and meeting none of the exclusion criteria. As there were a high number of articles reporting findings on predatory journals, they were further screened re-evaluating them for any deviations from the theme of this study. Additional searches listed by author names were not conducted. We did not formally rank these article based on their quality assessment as we expected heterogeneity of all selected review materials. A meta-analysis was not conducted in this study; a synthesis of our findings is presented.

FINDINGS

In total, 63,133 articles were identified in the databases, enlisted in table I. After reviewing their abstracts and titles for relevance, 9 articles were included in the literature review, presented in table II. The excluded articles did not meet the inclusion criteria. However, they were related (e.g., predatory journals with their challenges today), as they had little qualitative focus or lack of novel findings.

Description of Findings

Of the reviewed articles, all of them were published after 2015 that reflects the growing awareness about the processes pertaining to predatory publishing. The articles were published in education and other scientific journals including BMC Medicine, Journal of pathology



**Search topics were included in the title, abstract, or keywords.*

Table 1: Search process and items found.

informatics, and Sultan Qaboos University medical journal. Data for one focused on two developing regions. In contrast, another overviewed the knowledge and motivations that researchers had while publishing in predatory journals. The key finding of the studies published in BMC included the problems that researchers faced during the publishing process.

Concepts and basic metrics of predatory journals

The authors of the studies included their conceptualization of the predatory model with central links among all. The studies mainly emphasized on the awareness or lack thereof among researchers from different backgrounds. With a key focus placed on the concept of predatory or pseudo journals, it is imperative to emphasize their delineation.

Cohen et al. (2019) set the premise of their survey by noting that predatory journals fail to fulfil the basic

foundations of biomedical publication. These include the peer review process, circulation of materials, and access in perpetuity.^[15-16] While there is raised awareness in the scientific press today, Cohen et al. propose that no study has directly assessed the perceptions of the editors and authors involved. Their primary objective was to understand the motive that authors have to publish with potentially predatory journals while also assessing the editors' point of view. Cohen et al.'s stance that these so-called predatory journals take advantage of the open-access publication model fits in the state of events today.^[16] From the basic design of the predatory journals, early-career physicians may not suspect them to be illegitimate, and they are incentivized in an attempt to advance their careers.^[8] Their study proposes the defining criteria of a predatory journal is a point of contention among many researchers today. Beall's list is based on a single researcher's criteria has been a controversial

Authors/Year	Title	Defining Criteria	Design
Cohen et al. (2019)	Perspectives from authors and editors in the biomedical disciplines on predatory journals: survey study.	No study has assessed the perceptions of editors and authors involved. Predatory journals fail to fulfil basic elements of the biomedical publication.	Qualitative survey
Shen and Björk (2015)	'Predatory' open access: a longitudinal study of article volumes and market characteristics.	A lack of comprehensive studies about regional extent and distribution is seen. This longitudinal study relates key marketing trends with expressing article volumes.	Longitudinal
Cortegiani et al. (2019)	Predatory open-access publishing in anaesthesiology.	The study offers unique findings in the realm of anaesthesiology.	Quantitative
Stojanovski and Marušić (2017)	Does small equal predatory? Analysis of publication charges and transparency of editorial policies in Croatian open access journals.	Critical links between the quality of work by editors and the business model are presented.	Qualitative
Mercier et al. (2018)	Invitations received from potential predatory publishers and fraudulent conferences: a 12-month early-career researcher experience.	A 12-month period with a junior scholar as the corresponding author has important findings relating to electronic invitations.	Qualitative
Krasowski et al. (2019)	Burden and characteristics of unsolicited e-mails from medical/scientific journals, conferences, and webinars to faculty and trainees at an academic pathology department.	Both trainees and professionals receive a high volume of e-mails for publishing conference reports and manuscripts. The report analyzes studies localized to one academic medical centre.	Qualitative
Shamseer et al. (2017)	Potential predatory and legitimate biomedical journals: can you tell the difference? A cross-sectional comparison.	A cross-sectional comparison of potential, legitimate subscription-based and legitimate open access journals.	Qualitative
Cobey et al. (2019)	Knowledge and motivations of researchers publishing in presumed predatory journals: a survey.	The experiences and motivations of those who have published in predatory journals are analyzed with an open-ended survey.	Qualitative survey
Beshyah (2019)	Authors' selection of target journals and their attitudes to emerging journals: a survey from two developing regions.	A cross-sectional study that assesses practices and attitudes that influences decisions when choosing journals for publication.	Qualitative survey

Table 2: Summary of the literature review.

source.^[16] His list is not available as an online source today. Other sources are now present that confirm the certification of legitimacy in open access publishing. The Directory of Open Access Journals (DOAJ) is one crucial link that can enlighten potential authors. At the same time, the Open Access Scholarly Publishers Association (OASPA) has advanced the initiative of "high-quality open access publishing." With placing focus on editors and publishers, the perspective of both remains largely unknown in literature. Cohen et al. draw attention to the occurrence that authors publishing in predatory journals are either victims or complacent conspirators. The authors hypothesize that the editors and authors are unaware of the journals' actions. Shen and Björk (2015) delve into the negative consequence of open access publishing funded by authors, including questionable choices in peer review and marketing practices.^[17] Additionally, Shen and Björk express their concerns about the negative publicity that predatory journals have in the domain of open access journals. Their study reports about a branch of e-

business that is mainly concentrated on exposing scandals involving journals and publishers and the mere lack of peer review.^[17] The evident lack of comprehensive studies about this phenomenon consists of the extent of open access journals and their regional distribution. Shen and Björk state that scholarly journals have evolved like many areas in business and society. Electronic delivery of big bundles of journals with the addition of e-licensing is the dominating business model today.^[17] The authors classify open access journals as the main branch with a peculiar sub-branch named as predatory journals. Shen and Björk mention that a wide variety of these journals make individual articles available after payment only, termed as hybrid open access. Direct open access is termed as 'gold'.^[7] In addition, there is also a green route where third parties and authors can provide manuscript versions of their articles by providing internet availability and access; this is done on authors' webpages of subject-based repositories. A recurring theme is the use of Article Processing Charges (APCs) that has seen a rise in the last decade. Some journals have also reached

a very high scientific status that the authors tend to mention with reference to PLOS ONE, a successful model of mega journals.^[17] However, Shen and Björk write that the subclass of journals that provides rapid publishing without a set system for peer reviews is linked to pseudo-publishers. Also, authors require publications for their curriculum vitae, which is where 'predatory publishers' comes into action. Shen and Björk's assess the current number of articles published by predatory publishers every year. Namely, their distribution, the countries that they are published in, processing charges, and the rapidity of publishing.^[17]

Cortegiani et al. (2019) define predatory publishing as an exploitative fraudulent open-access publishing model that works under the false pretence of legitimate publishing without truly providing legitimate editorial services.^[18] The authors analyze this information in the field of anesthesiology and related specialities such as critical and respiratory medicine, intensive care, pain medicine, and emergency care. Cortegiani et al.'s view that the phenomenon has increased considerably in the past decade has led to challenging issues in the scientific community.^[18] Over half a million articles are published in predatory journals.^[18] Cortegiani et al. mention that the most convenient method is using spam e-mail to solicit scholars to join the editorial board and submit articles. However, at the early stage of scientific careers, there is a weakened ability to judge the ethics and reputability of said journals.^[18] The study presents activities of potentially predatory journals and publishers linked to anesthesiology and other specialities.

Stojanovski and Marušić (2017) approach the term predatory publishers and journals from the perspective that journals from small communities may be perceived as predatory.^[19] However, the authors state that other characteristics, such as the quality of their editorial work and business model, ought to be analyzed before categorizing. Stojanovski and Marušić write about the importance of transparency, in the research and development community where around USD 2 trillion is invested on a global scale. The public funds a significant portion of this research. A large portion of scientific knowledge is produced by commercial companies.^[19] However, the authors note that around 70% of the research results are irreproducible. The peer-review process has also been criticized for its slow process, despite its role as the backbone in the research community. Stojanovski and Marušić mention the 352-year long history that scholarly journals have with commercial publishers taking over after World War

II.^[19] The study notes that journals in Croatia share common problems with regional or local journals that come from scientific peripheries.

Mercier et al. (2018) review unsolicited electronic invitations that potential predatory publishers send over a period of 12 months.^[20] Publishing a manuscript as a medical trainee or during postgraduate studies is a valuable accomplishment, particularly if journals have a peer-review process worth noting. These are classic ways to present scientific discoveries in the community.^[25] However, the number of barriers to publication and the lack of experience to publish scholarly communications have led to the emergence of predatory publishing. To promote manuscript submission, publishers often use aggressive marketing campaigns. The critical link that is common among 'predatory' outlets includes fake addresses, impact factors, including a wide area of topics, and incentives such as rapid peer-review processes. Mercier et al. voice their concerns about the state of affairs of these journals wherein inaccurate data seem to threaten the integrity of scientific communication. The crux of every predatory publisher is the lack of adherence to ethical guidelines by COPE or ICMJE.^[31] In addition, the authors note that this phenomenon is an emerging hazard.^[20] Predatory or fraudulent conferences also present an emerging hazard that misleads hundreds of researchers.^[20] The study describes all unsolicited invitations from potential fraudulent conferences or predatory publishers over a 12-month period as a corresponding author and junior researcher.

Krasowski et al. (2019) note that conference presentations and journal publications are highly critical activities for those in commercial and academic research thereby impacting admission to schools, consideration for promotion and awards.^[21] As a result, the past two decades has shown an explosion in academic journals that operate online. The journals have been criticized for their quality, mass e-mail tactics, and editorial insight. Krasowski et al.'s definition of 'predatory journal' is used to describe journals that have poor quality and used aggressive marketing tactics.^[21] While no standard definition is in use today, most of the articles reviewed for this study tend to have distinct underlying elements.^[31]

Shamseer et al. (2017) conduct a cross-sectional comparison of legitimate biomedical and potential predatory journals.^[22] They state that the internet has transformed scholarly publishing with the advent of open access publishing. These journals pose particular problems in the emerging research market today. Shamseer et al. compare characteristics of different types of biomedical journals that include presumed legitimate,

fully open access journals, potential predatory journals, and presumed legitimate subscription-based biomedical journals.^[22] Many potential authors and researchers are unaware of the problem that many predatory journals are indistinguishable from legitimate journals.^[13] The difference between legitimate and pseudo-journals is a specific topic of interest today that helps to define the term 'predatory journals' in the current landscape.

Cobey et al. (2019) identify the threat of presumed predatory journals as a further layer of complexity to the journal selection process. Seemingly, these outlets exploit the open access-publishing model.^[23] Without action by stakeholders in the process, there is a failure to address the motivation behind researchers. A public review of German researchers was conducted in a study; it was found that over 5000 scientists published in the journal where a peer review access did not occur.^[23] Another study assesses the factors that influence the decision to choose publications. The author assesses the practices and attitudes of potential authors in the current landscape. The key driving factors that influence decisions in Africa and the Middle East in choosing the target journal include the indexation status, impact factor, the international status, and possibly free publication.^[24,26]

Methods used in the articles

Of the 9 reviewed studies, 8 combined qualitative methods, one included a longitudinal study, whereas two others used a survey format. One was a cross-sectional study, while another used e-mail based findings. Cohen et al. accessed Beall's list and identified 2567 publishers; 350 were chosen via a random generator.^[16] Their study included a survey, randomized control trial into the control group, with summary statistics that described the cohort. Shen and Björk carried out a three-stage-sampling method.^[17] Whereas, Cortegiani et al. (2019) checked journal websites based on their enrolling criteria; both studies employed descriptive statistics using excel. Stojanovski and Marušić used the Croatian repository using OASPA principles.^[19] Their collected information outlined location, peer review level, types of papers, and number of peer reviewers. Mercier et al. conducted a prospective extraction of invitations, and conference data regarding unsolicited electronic invitations over a year; descriptive statistics were summarized with medians, IQR, and SD. Krasowski et al. led a survey with analysis of e-mail data in spreadsheets such as articles in the journal being reviewed, mention of the term 'rapid, Index Copernicus, and ISSN'.^[21] Shamseer et

al. and Beshyah led a cross-sectional study; the former study identified journals in three comparison groups including potential predatory, presumed legitimate open-access, and presumed legitimate subscription-based.^[22,24] The latter used a questionnaire shared via survey monkey, found data regarding academic and professional characteristics and calculated a score to determine authors' influencing factors. Both studies utilized descriptive statistics and provided a summary of continuous and dichotomous data. Cobey et al. had online survey links that were used with MailMerge software. Surveys were shared via Survey Monkey links, with summary statistics regarding motivations, experiences, and knowledge of researchers.^[23]

RESULTS

Four themes are concerned with the results of the synthesis. They include factors:

1. Related to the journal,
2. Academic and professional,
3. Dissemination,
4. Personal.

Related to the journal

Factors related to the journal analyze whether the paper fits with the journal, the appearance or perception of the journal, and the ease of publishing. Cohen et al. find that on the surface, these journals provide a seemingly beneficial service to authors.^[16] In a cohort study, an analysis of authors' awareness of the journal's perception was assessed. The authors submitting to predatory journals mentioned that they underwent revisions as part of the process. It was also estimated that 35% of these articles were rejected.^[16] However, these findings do not bring awareness to the peer-review process that the journals govern. The predatory journal market's worth today is around \$74 million, with estimates of global subscription reaching \$10.5 million.^[17] A few of the identified journals were indexed in Scopus and PubMed. False indexing and dubious metrics were key characteristics identified across predatory journals in many studies.^[16-18] Reported locations of these journals were assessed via Google Maps and a study showed 'unreliable' results in around 50% of the cases. Only 33% of the assessed journals reported that the presence of EIC_[18] is a requirement for an international recommendation. Less than 25%^[18] of them reported their policies against scientific misconduct. The availability of instructions for reviews was present in only 30.3%^[19] of the studies analyzed. A study showed that 23.3% journals sent e-invitations to promote the use of their business model.^[20] A mention of PubMed or MEDLINE was noted in 19.7% of e-mails sent to authors.^[21] 38.8% of these e-mails noted peer review in

their communication, with 2.6% mentioning numeric factor. 76.4% of the journals that described their indexation categories were not found in the resources and databases examined, hence, confirming fraudulent metrics related to the journal.^[21]

Academic and Professional

Factors related to academic and professional metrics include general publishing pressure. Other causes include building careers, and seeking employment. Many authors are aware of predatory publishing, and they are not necessarily tricked into publishing. However, as universities promote 'international publications,' authors publish in journals without questioning quality measures.^[17] A global North-South dilemma prevails where developing countries homogenize the view of 'academic achievements' based on how often one publishes. In this sense alone, authors and their affiliations are a structural problem where the lack of placement in 'high quality' journals leads them to publish in 'pseudo' journals. A study termed 'Gold open access journals' in the Croatian database as ones that published free of charge and that did not fit the criteria for predatory journals.^[20] However, their standards of publication still required quality control and attention.^[19] Mercier et al.'s study confirmed that unsolicited e-mails from publishers are a common occurrence.^[20] Only 35.3% of invitations were related to the author's work in the year-long study. An oncologist received about 100 spams by potential predatory publishers. Another individual received 26 invitations.^[20] Yet another study noted that 55.9% respondents thought that these journals provided new opportunities for authors and researchers without affecting their professional standing.^[20,28]

Dissemination

Factors related to dissemination include open access, its wide readership, and the international scope of the journal. As far as the international scope and presence is concerned, Cohen et al.'s study found that 40% of authors were from high-income countries, with 23% of authors from India.^[16] Shen and Björk found that some journals in 2012 charged on average \$800, whereas publications that charge around \$104 dominate the market today.^[19] However, Shamseer et al. note that journals are priced anywhere less than \$150. Around 75% of predatory journals were localized to LMICs as compared to 19.56% of open access journals.^[20] Indian journals also have a propensity in the single-journal stratum. A very low share of authors (2.2%) and publishers (0.5%) from South America is witnessed, as opposed to countries like Nigeria and India that show higher statistical trends. It was found that electronic

invitations were received from UK, Italy, Spain, United Arab Emirates, Netherlands, Thailand, and Singapore, who posed as conference organizers.^[20] As far online correspondences were concerned, 33.2% e-mails retrieved in the study were localized to the United States, with combined keywords including 'keynote speaker' or 'platform organizer.' Often, journal editors are unaware of ethical rules and regulations. Beshyah notes that around 33% of authors from Africa and the Middle East had no previous experience in publishing.^[23] Hence, the deficiency of strong research culture in developing countries leads to a lack of awareness regarding key metrics to identify emerging journals as legitimate.^[29]

Personal

Personal factors include the lack of knowledge and awareness, in addition to the interest to publish. In a cohort study, the authors reported that publication is an imperative facet in terms of academic promotion.^[16] While many editors were familiar with predatory journals, 67% of them were unaware.^[16] A high prevalence is seen in the United States and India. However, the services provided by these journals require caution in branding for authors and editors.^[16] It was proposed that 47% of the responding authors had been a part of the scholarly publishing process for over 15 years.^[16] 'Think. Check. Submit' is a new initiative that promotes integrity, educates new researchers, and builds credible research links in the community.^[16] In another study, 18.3% of respondents noted that they perceived the journal based on the familiarity of the name of the journal, a platform for submission, along with their ideas that high-quality journals operate with nepotism.^[22] Around 28% of respondents in a study were still oblivious to the dubious nature of the journal as their affiliations accepted their publications in said journals.^[23] However, 65.9% of participants did not face any career risks related to the predatory nature of publishing.^[23]

DISCUSSION

In the modern era, internet use has enabled open access publishing to flourish. Traditional scholarly publishing is a multi-faceted process involving copyright transfers from authors to publishers with allocated fees to provide access to manuscripts. However, traditional publishing methods are not preferred by many due to high costs or prejudices in the process. An open-access model allows authors to retain rights to their work while also permitting immediate availability to readers with allocated fees.^[27] Typically, the process of open access articles is associated with online circulation and publication. Both traditional methods and open access models encompass peer review, editing, and article promotion. With the digitalization of scholarly content, the presence of so-called "predatory" publishing

has risen. Our literature analysis on Croatian open access journals reveals that majority of them do not have article processing charges.^[19] This was a central demarcation from predatory journals; however, this transparency in editing policies is not always distinct. As far as the transparency of editorial work is concerned, the majority of Croatian journals had clear guidelines about authors' responsibilities.^[19] These findings were similar to journals in Eastern and Central Europe. Our literature review has highlighted that predatory journal authorship is not limited to early-career researchers only. Majority of authors studies in one article were unfamiliar with practices in pseudo journals, despite being published in questionable journals. It was found that 39% of editors were unaware of the practices that such journals conducted.^[16] Pseudo-journals cause problems that are limited and regional in origin. We believe that the volumes of publishing in these journals will cease in terms of growth in the near future. Open access publishing has rapidly gained momentum due to the action of policymakers and funders. However, this mainly creates opportunities for researchers from countries where predatory publishing is accessible; particularly because journal policies waive article processing charges for these authors.^[17,26] Probable or potential predatory open-access journals and publishers are broadly present in anesthesiology and other fields. Our analysis found that researchers lack a detailed review of journals' characteristics in the COPE, DOAJ, and ICMJE registries. Our literature review provides an accurate view of the state of open access publishing today. Simply put, the world of scholarly publishing is far from black and white. Lists of 'predatory' publishers and journals are no longer reliable, and all stakeholders are responsible for transparency and integrity in the publication process. Fraudulent conferences and predatory publishers pose threats to scientific knowledge and its dissemination. With the use of aggressive marketing campaigns, clinicians and researchers are steered towards contributing their findings.^[20] Our review also found that the promotion of Index Copernicus and the associated Index Copernicus value was standard in e-mails sent by publishers. The validity of this value is challenged because a detailed analysis of journals in this index has not been published. Studies also confirmed that the term 'predatory' had been applied to journals that have poor scientific credibility and quality. The blacklist approach has been criticized. However, this approach was best exemplified by Beall's list that included a now-defunct

list of predatory journals. It was found that there are several limitations to this approach because the reasoning behind placing a journal in this category is unclear.

CONCLUSION

Research mentorship, realigning research incentives, and education is vital to decrease the impact of predatory publishing in the near future. Potential authors necessitate a thorough check of the journal's reported location, policies of scientific misconduct, and English language form before submitting their manuscripts. Our literature review suggests that there is a lack of one single definition for predatory journals. We believe that it is essential for potential authors and young researchers to have clear guidelines and make demarcations of potential journals that seem dubious. Moreover, the authors' selection of publishers should be modified to control the risks of tainting open access publishing with fraudulent journals. Editors ought to embrace full transparency of the journal's structure and policies. This will promote the quality of the journal and demarcate legitimate journals from predatory ones. Journal repositories and indexing databases must be made available publically. Clear Criteria will ensure that journals do not misuse the open-access publishing system for financial gains. Finally, the academic and research community ought to revise their criteria and recognize high quality and author journals as opposed to 'predatory' journals.

LIMITATIONS

Our literature analysis provides an accurate view of the current situation regarding predatory journals and their widespread presence in the open access system. However, we recognize the limitations of our analysis. We did not adopt PRISMA guidelines; however, the extensive pilot study followed a methodology of literature search and review. Moreover, a qualitative analysis was not led, although the addition of said analysis would not have improved our review. Only new and relevant material, published within the last five years, was used. As predatory/pseudo publishing has garnered attention in the last few years, these sources represent current experiences. Although our search included articles indexed in PubMed, only relevant reports in English were selected.

CONTRIBUTIONS TO SCIENTIFIC KNOWLEDGE

Our literature review provides an accurate view of the state of open access publishing today. Simply put, the world of scholarly publishing is far from black and white. Lists of 'predatory' publishers and journals are no longer

reliable, and all stakeholders are responsible for transparency and integrity in the publication process. Our review also found that the promotion of Index Copernicus and the associated Index Copernicus value was standard in e-mails sent by publishers. Our literature review has highlighted that predatory journal authorship is not limited to early-career researchers only.

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CONFLICT OF INTEREST

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