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<td>Complete List of Authors:</td>
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<td>Keywords:</td>
<td>Predatory journals, Motivations to publish, Survey, Corresponding authors</td>
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Knowledge and Motivations of Researchers Publishing in Predatory Journals: A Survey

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Abstract

Objectives: To develop effective interventions to prevent publishing in presumed predatory journals, it is helpful to understand the motivations and experiences of those who have published in these journals.

Design: We conducted an online survey delivered to two sets of corresponding authors. It contained basic demographic information, as well as questions about researchers' perceptions of publishing in the presumed predatory journal, type of article processing fees paid, and the quality of peer review received. The survey also asked six open-ended items about researchers' motivations and experiences.

Participants: Using Beall’s lists, we identified two groups of individuals who have published empirical articles in biomedical journals that were presumed to be predatory.

Results: Across both sets of corresponding authors, 82 of them partially responded (~14% response rate (11.4% (44/386) from the initial sample, 19.3% (38/197) from second sample) to our survey (N= 59 male, 72.8%). The top three countries represented were India (N=21, 25.9%), USA (N=17, 21.0%), and Ethiopia (N=5, 6.2%). Only 3 participants (3.9%) thought the journal they published in was predatory at the time of article submission. The majority of participants first encountered the journal via an e-mail invitation to submit an article (N= 32, 41.0%), or through searching online to find a journal with relevant scope (N=22, 28.2%). Most participants indicated their study received peer review (N=65, 83.3%), and that this was helpful and substantive (N=51, 79.7%). More than a third (N=32, 45.1%) indicated they did not pay fees to publish.
Conclusions: This work provides an important piece of evidence to inform policy to prevent future research from being published in predatory journals. Our research suggests that common views about predatory journals (e.g., no peer review, fees to publish) may not always bear true, and that a grey zone between legitimate and presumed predatory journals exists.

Strengths and Limitations of this Study

- Survey specifically explored researcher motivations to publish in predatory journals
- Survey targeted biomedical researchers, where dissemination of preclinical and clinical outcomes may affect health services and patient care
- Survey is limited by a low response rate from participants

Funding Statement

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Competing Interest Statement

The authors do not have any competing interests.
Introduction

In the current scholarly landscape, the threat of presumed predatory journals (henceforth described as ‘predatory journals’) adds a further layer of complexity to the journal selection process. There is a sense that predatory journals exploit the open access (OA) publishing model (in which authors typically pay a fee to publish to ensure that their work is publicly and freely accessible), often by “spamming” researchers(1,2) with offers of rapid publication at a much lower cost than legitimate OA journals, or without acknowledging upfront that accepted manuscripts are subject to publication fees(3,4). Subsequently, it is suspected that these journals conduct frivolous (or no) peer review and often accept and publish manuscripts without any editing or editorial oversight whatsoever(5).

Without action by relevant stakeholders, the potential for predatory journals to continue to penetrate the scholarly community is great(6,7). Understanding what predatory journals are(8) and what motivates researchers to submit to and publish in these journals is essential to preventing future submissions. Failure to address predatory journals means that they will continue to contribute to waste and inefficiency in dissemination. A recent study which examined more than 45,000 Italian CVs found that approximately 5% contained research thought to be published in predatory journals(9). A related survey of those researchers who published in predatory journals (response rate 54%) found that about 33% had colleagues suggest a predatory journal as an option for submission, 27% of researchers submitted their work to a predatory journal in response to an e-mail invitation, while 12% said their decision for where to submit their manuscript was linked to a conference presentation. A survey by Kurt(10) obtained responses from 96 authors who had published in 50 randomly selected journals on Beall’s journal list. Respondents were from a range of scientific fields, and the survey was
predominantly composed of open-ended questions analysed qualitatively. Kurt reported that the reason these individuals published in predatory journals were captured in four themes: social identify threat, unawareness, high pressure, and lack of research proficiency. These findings provide initial evidence for how researchers come to submit their papers to predatory journals, but they do not explicitly consider a broad range of motivations. In addition, it is likely that there are nuances between scientific disciplines, which may have different norms and expectations pertaining to publishing scholarly activity.

Here, we seek to examine the motivations and experiences of biomedical researchers who have submitted to predatory journals. To address the prevalence of these and other motivations, we conducted a multi-national survey of researchers who published in predatory biomedical journals.

**Methods**

This study received ethical approval from the Ottawa Health Science Network Research Ethics Board (20170956-01H; see: https://osf.io/xaze9/). We conducted an online survey to obtain information about the motivations and experiences of researchers who have published in potentially predatory biomedical journals.

*Identifying participants*

Initially, we identified a sample of participants to send our survey to using an existing dataset of 1907 articles (7) that had been published in predatory biomedical journals. This sample was derived in a previous study examining a random selection of articles published in journals listed
on Beall’s Lists of ‘potential, possible, or probable’ predatory journals(11). The dataset included the e-mail contact details for the corresponding authors of each paper when available. From the total group of 1907 articles, we selected those, and related author details, that were coded as having the following research designs: randomized controlled trial (N=94), observational cohort (N=180), or a pre-clinical research-based article (N=201). These study designs were selected to provide a combination of clinical and pre-clinical research, and in an effort to achieve a response rate of approximately 200 participants. We had anticipated a response rate of ~40% given rates of response from previous work(21,22). This sampling procedure is consistent with the methods described in the original study protocol that was posted prior to data collection on the Open Science Framework (OSF): https://osf.io/wgm7f/. A low response rate (see results) ensued. We considered that one reason for the modest response rate to the initial survey was that the authors sampled for our survey had been gathered in a study published in 2015. It was thought that obtaining a more recent sample of authors may result in a greater response rate. Therefore, after seeking a revision in ethical approval, we identified a second sample of potential authors of predatory journals to which to send our survey.

To identify this second sample, we used two approaches. Firstly, we used Beall’s lists to identify 100 additional journals. Although Beall removed his lists of predatory journals and publishers from his blog website in early 2017(12), his lists have been curated and updated anonymously at this website: https://beallslist.weebly.com/. We extracted all journals on Beall’s list of single journal publishers on March 5th, 2018. Journal names and their corresponding URL (N=1310) were extracted and then their websites were screened in duplicate (KDC, HR, AG, DBR) to determine if they were active websites, if they published in English, and published research that
was predominantly biomedical. We used the Medline definition to define biomedical journals as journals “predominantly devoted to reporting original investigations in the biomedical and health sciences, including research in the basic sciences; clinical trials of therapeutic agents; effectiveness of diagnostic or therapeutic techniques; or studies relating to the behavioural, epidemiological, or educational aspects of medicine”. From the journals that met these inclusion criteria (N=158), we then took a random sample, using the [RAND] function in Excel, of 100 journals. Secondly, we obtained a random sample of 100 biomedical journals published by OMICS (a large publisher of predatory journals (14,15)). To do so, we selected all journals classified by OMICS as being “Clinical and Medical Sciences” journals. We de-duplicated journals that were listed more than once, which resulted in 500 unique journals, and using the [RAND] function in Excel, we randomly selected 100 journals.

From the combined random sample of the 200 journals obtained from the single journal publishers on Beall’s list (N=100) and from OMICS journals (N=100), reviewers in teams of two (DR, HR, AG, KDC) extracted the most recently posted research article (i.e., empirical article; we excluded commentaries, non-systematic reviews, editorials, etc.) from each of these journals. They subsequently extracted information including: the year of publication, the corresponding author’s name and e-mail address (if identifiable), the corresponding author’s country of origin (first listed in affiliation), the article title, and a classification of research type (clinical, preclinical, other). If there were no research articles available, the extracted research article did not provide accurate contact details of the corresponding author, or journal website did not function, we replaced the journal with another randomly selected journal (N=30 journals replaced from 100 Beall’s list journals; N=14 journals replaced from OMICS list journals).
Survey administration

Online survey links were sent to both samples of participants from the primary investigator (KDC) using a standardized recruitment script (available on the OSF: https://osf.io/27bkm/) via a personalized email which specified the participants name, and the title of the identified article. We used MailMerge software to expedite this process. Participants were given two weeks to complete the survey. Participants received a standard follow-up e-mail reminder one week after the receiving their original invitation to participate.

Survey

The survey used (see: https://osf.io/27bkm/) was purpose built, administered in English, and distributed using SurveyMonkey(16). The survey began with participants completing online consent, and then several items intended to capture respondent demographics (e.g., age, gender, country of residency, education level, and research specialty area). Subsequently, the survey asked about respondents’ research status and publication record. Then, the survey asked respondents about any relevant institutional publication policies, and about whether respondents felt pressured by their institution to publish. Several items then addressed the respondents’ experience submitting and publishing the article we captured in our sample of predatory publications. Six open-ended questions then addressed the respondents’ decision to publish in the particular journal, when they learned of its potentially predatory nature, and the career implications of the publication. No personal health information or personally identifying information was collected.
When participants completed the survey, they were provided with a generic research code, which they were instructed to send back to the project team via another SurveyMonkey link in which they also reported their e-mail address. The project team subsequently reimbursed participants for their time in the form of a $20CAD online Amazon gift card voucher. Following this method allowed us to successfully reimburse participants without them having to provide personal identifying information as part of their survey responses.

**Data analysis**

We report descriptive statistics for characteristics of the participants and summary statistics for quantitative items pertaining to researcher’s experiences, knowledge, and motivations. Data are reported using means or percentages as relevant. Given the relatively modest sample, in a deviation from our protocol, we do not provide comparative data illustrating findings by researcher rank, gender, discipline, or geographic location. For open-ended survey items, we used conventional content analysis(17). Without using preconceived categories, two researchers (AG, DBR) independently identified key themes in the data then discussed the themes generated until consensus was achieved for themes and subthemes. Key themes are summarized and presented using a narrative synthesis with illustrative quotes and using count data where relevant. Data was exported from the survey software into SPSS where means and percentages were calculated. Qualitative data was analyzed in Microsoft Word.

**Patient and Public Involvement**
The focus of this research was the motivations of authors to publish in predatory journals. As such we did not involve patients or the public in the development of the research question or outcomes.

Results

We sent our survey to a total of 583 potential participants. This number is lower than the combined number of articles identified from the original study database (randomized controlled trial (N=94), observational cohort (N=180), or a pre-clinical research-based article (N=201)) and the 200 additional sampled articles. This is because not all articles in the original study database contained corresponding e-mail addresses of authors, and in both samples several of the e-mails sent received bounce-back messages.

A total of 82 participants partially responded to our survey (44 from initial sample, 38 from second sample). This represents an overall response rate of approximately 14% (11.4% (44/386) from the initial sample, 19.3% (38/197) from second sample). Demographic characteristics of participants are described in Table 1. We first examined the quantitative survey item results (Table 2), then we examined qualitative survey results (Table 3).

Research institutions

Five percent (N=4) of survey respondents indicated that their institution has a policy against publishing in predatory journals at the time they published their article. Forty-one percent (N=32) of respondents indicated they felt pressured to publish by their institution, and 25.3%
(N=20) indicated their institution required them to publish a specific number of articles to be considered for tenure and promotion.

Participants’ perceptions and experience publishing

When participants were asked about the article sampled, 46.3% (N=38) indicated they did not think the journal they published in was predatory at the time of submission but that they do believe so now, 43.9% (N=36) felt the journal they published in was not predatory at the time of submission and maintain this view, while just 3.9% (N=3) indicated they were aware the journal was predatory at the time of submission. Participants indicated that they became aware of the journal they published in predominantly through direct e-mail invitations to submit from the journal (N=32, 41.0%), or through online searching for a relevant journal to which to submit (N=22, 28.2%). Participants indicated that they submitted their article via an online portal on the journal website (N=55, 70.5%) or via a direct e-mail to the journal (N=21, 26.9%). A small percent (N=2, 2.6%) could not remember how they submitted their article. Slightly more than a third (N=28, 35.4%) of participants indicated that they had submitted their article to another journal previously. Articles that had been submitted previously had been rejected by a mean of 2.04 (0.99 SD) journals. A little more than a quarter (N=21, 27.6%) of participants said they would publish in the journal in question again, while 36.6% (N=30) would not, and 30.5% (N=25) were uncertain.

Article processing charges
Seventy-one of the 82 participants (86.9%) responded to the question asking about the fee paid to publish their work. Participants responded in the currency they paid, and these rates were converted using Google to US dollars. This was done on June 7, 2018, and rates were rounded to the nearest dollar. As currency rates fluctuate, these values should only be considered as estimates. Of the 71 respondents, 45.1% (N=32) indicated they did not have to pay an article processing charge to publish their article. Those respondents who did pay a fee (N=39, 54.9%) paid between $30-4000 US dollars (Mean: $347.63; Median: $74; Sum: $24,682).

**Peer review**

The majority (N=65, 83.3%) of participants indicated that their paper underwent peer review, while 16.7% (N=12) indicated it did not. Among those participants who indicated their paper was peer reviewed, 79.7% (N= 51) indicated they felt the peer review was substantial and helpful, while 20.3% (N=13) indicated it was not. Twenty of the 64 participants (31.3%) who indicated that their article underwent peer review indicated that they would be willing to share the reviews with our research team. Just 2 eventually forwarded reviews (one of which was a paper proof not a review), and one author copied the review into the survey.
Table 1. Participant characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Sample</th>
<th>N</th>
</tr>
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<tbody>
<tr>
<td><strong>Age range (Mean±SD)</strong></td>
<td>27-77  (45.46±13.14)</td>
<td>80</td>
</tr>
</tbody>
</table>
| **Sex, N (%)**                                       | Male: 59 (72.8)  
Female: 21 (25.9)  
Other: 1 (1.2) | 81  |
| **Top 3 Nationalities, N(%)**                        | India: 21 (25.9)  
USA: 17 (21.0)  
Ethiopia: 5 (6.2) | 81  |
| **Research discipline, N (%)**                       | Clinical research: 49 (59.8)  
Pre-clinical/basic research: 27 (32.9)  
Other: 6 (7.3) | 82  |
| **Research status, N (%)**                           | Undergraduate student: 1 (1.3)  
Master’s student: 5 (6.3)  
PhD student: 13 (16.3)  
Postdoctoral student: 3 (3.8)  
Assistant/Associate/Full Professor: 32 (40.0)  
Researcher at research institute: 13 (16.3)  
Researcher in private sector: 3 (3.8)  
Other: 10 (12.5) | 80  |
| **Number of papers published within a year of the presumed predatory publication, N (%)** | 0: 2 (2.6)  
1-3: 39 (50.6)  
4-6: 20 (26.0)  
7+: 15 (19.5)  
Unknown: 1 (1.3) | 77  |
Table 2. Summary results of quantitative survey items

<table>
<thead>
<tr>
<th>Item</th>
<th>Response</th>
<th>Total N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Institutional items</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did the primary institution you were based at the year you published your paper have a written policy for publishing that prohibited predatory journals? (N, %)</td>
<td>Yes: 4 (5.0) No: 53 (66.3) Don’t know: 23 (28.7)</td>
<td>80</td>
</tr>
<tr>
<td>Did the primary institution you were based at the year you published your paper make you feel pressured to publish (e.g., as part of a degree requirement or for promotion and/or tenure)? (N, %)</td>
<td>Yes: 32 (41.0) No: 46 (59.0)</td>
<td>78</td>
</tr>
<tr>
<td>Did the primary institution you were based the year you published your paper have a policy on whether faculty need a specific number of publications to be considered for promotion or tenure? (N, %)</td>
<td>Yes: 20 (25.3) No: 40 (46.5) Unsure: 9 (11.4) Not applicable (e.g. I was a student): 10 (12.7)</td>
<td>79</td>
</tr>
<tr>
<td><strong>Participants’ perceptions and experience publishing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We believe the journal in which you published may be a predatory journal. When submitting, were you:</td>
<td>Aware that it was predatory: 3 (3.9) Not aware that it was predatory, but now do consider it predatory: 38 (46.3) Not aware that it was predatory and continue to think it is not predatory: 36 (43.9)</td>
<td>77</td>
</tr>
<tr>
<td>How did you first become aware of this presumed predatory journal prior to submission?</td>
<td>E-mail invitation: 32 (41.0) A colleague: 10 (12.8) Supervisor/mentor: 5 (6.4) Reading the journal: 4 (5.1) Online searching for journal: 22 (28.2) Other: 5 (6.4)</td>
<td>78</td>
</tr>
<tr>
<td>Had the paper you published in this presumed predatory journal been submitted elsewhere previously?</td>
<td>Yes: 28 (35.4) No: 48 (60.8) Unsure: 3 (3.8)</td>
<td>79</td>
</tr>
<tr>
<td>How many times had the paper been submitted previously?</td>
<td>1: 8 (28.6) 2: 12 (42.9) 3: 4 (14.3) 4+: 2 (7.1) Don’t remember: 2 (7.1)</td>
<td>28</td>
</tr>
<tr>
<td>How was the paper submitted to the</td>
<td>Online submission portal: 55 (70.5)</td>
<td>78</td>
</tr>
</tbody>
</table>
What factors or criteria influenced your decision to submit your manuscript to this journal instead of another journal (select all that apply)?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I felt it was the appropriate journal for my publication based on my normal process for selecting a journal (e.g., quality of journal, fit of topic/audience, etc.)</td>
<td>53 (67.1)</td>
</tr>
<tr>
<td>Adding to my CV quickly for hiring, promotion or tenure</td>
<td>6 (7.6)</td>
</tr>
<tr>
<td>Adding to my CV quickly for a grant application</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>I needed to publish a paper quickly as part of my coursework/program</td>
<td>17 (21.5)</td>
</tr>
<tr>
<td>General pressure to publish</td>
<td>13 (16.5)</td>
</tr>
<tr>
<td>Unable to publish the paper in other journals</td>
<td>13 (16.5)</td>
</tr>
<tr>
<td>Other</td>
<td>4 (5.1)</td>
</tr>
</tbody>
</table>

Did the paper receive peer review? Yes: 65 (83.3)  
No: 12 (16.7)

Was the peer review substantial and helpful? Yes: 51 (79.7)  
No: 13 (20.3)

Where did you obtain money to pay the fee to publish?  
Research grant funding: 7 (9.6)  
University/employer research funding: 10 (13.7)  
Personal money: 29 (39.7)  
Other: 3 (4.1)  
No fee paid: 24 (32.9)

Would you publish in this journal again in the future?  
Yes: 21 (27.6)  
No: 30 (36.6)  
Uncertain: 25 (30.5)
Qualitative Survey Results

Open-ended survey responses were categorized by survey question through content analysis. Themes and subthemes are presented by survey question in Table 3. Below, we provide a narrative synthesis of the data, including motivations and reasons for selecting the journal (survey questions 11 & 13), learning about the journal’s predatory nature (questions 12 &15), career risks (questions 14), and evaluating journals for future submissions (question 16).

Motivations and Reasons for Selecting the Journal

When asked about factors that influenced their decision to submit to the selected journal, participants noted academic and professional factors (e.g., publishing pressure, for tenure); factors related to the journal (e.g., fit of paper with journal, perception of quality); factors related to the paper published (e.g., difficulty publishing elsewhere due to low originality of the research, previous rejections); desire to disseminate research; invitation from the journal; recommendation from a colleague; or personal factors (e.g., lack of mentorship, lack of knowledge, personal motivations to publish). In addition to general publishing pressure, seven respondents (8.5%) noted that they had to publish as part of degree requirements or did so to support the CV of a student. Fifteen participants (18.3%) also reported that they perceived the journal to be of quality for reasons such as: “reputation of the editor,” “the journal name seems familiar,” “well formatted manuscript submission platform,” “Journal based in United States, or “papers already published in this journal by U.S. and German scientists”. Others valued the ease and speed of publication and the journal’s low fees, as captured by one response: “Frustration with number of hours required to publish in standard journals after factoring in rejection.” One participant (1.2%) noted the importance of supporting new and small journals.
When asked about other motivations for publishing in the selected journal, several participants expressed frustration with “traditional” journals, noting very long ‘time to publication’ periods, high fees, unnecessarily critical peer review, and a bias toward publishing only the work of well-known researchers. One respondent captured the sentiment:

“Open access is great. Other journals have too much unjustified criticism in their peer review process. Quite often even excellent articles are rejected while mediocre or trivial papers of well-known scientists or people of their lab are published. Many people think that quality journals operate [with] nepotism.”

Learning about the Journal’s Predatory Nature

Twenty-four participants (28.3%) reported that our survey was the first time they learned the journal was potentially predatory. Thirteen participants (15.9%) disagreed that the journal was predatory and provided reasons such as: “I received peer review first,” “It took over 3 months before my manuscript was published,” and, “[The journal] is accepted by the university.” Those that did agree the journal was predatory, and learned about its nature prior to the survey, said they learned it was predatory because of hidden fees or unusual payment processes, publication processes (e.g., incoherent or non-critical peer review, atypical correspondence), a list of predatory journals, or a lack of journal indexing.

Participants were also asked if anyone discussed the predatory nature of the journal with them. Sixty-one participants (74.4%) said no. The remaining participants (N=21, 25.6%) were approached by colleagues and co-authors, supervisors, or university staff. One participant (1.2%)
responded they were approached “… only [by] close colleagues, who thought I had finished my research career.”, perhaps implying their perspectives of the risks of publishing in presumed predatory journals.

**Career Risks**

Most participants (N=54, 65.9%) reported not experiencing any career risks related to publishing in a potentially predatory journal. The remaining participants (N=28, 34.1%) noted that they were reprimanded by their supervisor, received few citations of their paper, experienced damage to their reputation, and missed the opportunity for helpful peer review. Two participants (2%) reported having attempted to retract the article by contacting the journal, but the articles were still published.

**Evaluating Future Journals Prior to Submission**

Nineteen participants (23.2%) reported that this experience has not changed how they evaluate journals prior to submitting other articles. The other participants (N=63, 76.8%) stated they would be more careful in future journal selection by checking: impact factor, a DOI or ISSN, journal indexing, background of editor, peer-review process, citations, Beall’s list, or with others (e.g., colleagues, university management, supervisors). Some participants shared that the experience has taught them to never pay for publication, to only publish in well-known journals, and to not publish in open-access journals.

**Table 3. Summary results of qualitative survey responses**

<table>
<thead>
<tr>
<th>Item</th>
<th>Themes (Subthemes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>What factors or criteria influenced your</td>
<td>Academic and Professional Factors (General; General</td>
</tr>
</tbody>
</table>
decision to submit your manuscript to this journal instead of another journal (e.g., hiring, promotion, tenure, requirements to complete degree)?

- Publishing pressure; As part of current job requirements;
- For tenure or promotion; Seeking employment/to get hired;
- Part of degree requirements (trainees); To support trainees/build CV of trainees; Pressure to publish from trainee

Factors Related to the Journal (Paper fit with journal;
- Perception or appearance of quality; Journal is fast to publish; Publication cost; Ease of publishing; Free editing; Experience with journal)

Recommendation (From colleagues;
- From Omni group conference)

Factors Related to the Paper Published (Difficult to publish elsewhere; Limited options for the topic of the paper; Previous rejection(s); The work is good)

Desire to Disseminate (Wide readership; Open access; International scope)

Invitation from Journal (Promotional emails)

Personal Factors (Lack of mentorship in choosing journal; Lack of knowledge (before predatory journals were common knowledge); Personal pressure/interest to publish)

How did you first become aware that the journal you published in was potentially predatory in nature or may not be scientifically rigorous (e.g., I received no peer review although the editor said the article will be published within 24 hours)?

This Survey

Disagree that Journal is Predatory

Concerns Raised by Others

Fees (Payment)

Publication Process (Peer review; Atypical correspondence; Continued promotion emails)

List of Predatory Journals

Lack of Indexing

Were there other motivations for publishing in the journal that we have not asked about (e.g., salary increase)?

No

Personal Factors (Personal Satisfaction)

Academic and Professional Factors (Publication pressure; Self-citation; Part of being a researcher; Salary increase; Promotion in developing countries; To increase program rankings)

Factors Related to the Paper Published (Topic fit with journal; Low quality of manuscript; Publishing unpublished work; Student paper)

Factors Related to the Journal (Compared to “traditional journals”)

Desire to Disseminate Research (Publishing before retirement; Dissemination of work is easy because of the internet)

Supporting New or Small Journals
<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you see any career risks associated with publishing in this journal (e.g., getting caught by a colleague)?</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Yes (Risks Not Specified)</td>
</tr>
<tr>
<td></td>
<td>Reprimanded by Supervisor</td>
</tr>
<tr>
<td></td>
<td>Few Citations</td>
</tr>
<tr>
<td></td>
<td>Damage to Reputation</td>
</tr>
<tr>
<td></td>
<td>Retraction (Published even after retraction; Requested retraction)</td>
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<tr>
<td></td>
<td>Continued Emails from Journal</td>
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<tr>
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<td>Missed Opportunity for Peer Review</td>
</tr>
<tr>
<td>Has anyone else discussed the potentially predatory nature of this journal with you (e.g. the paper’s co-authors, your dean, supervisor, tenure &amp; promotions committee)?</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Yes (Individual Not Specified)</td>
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<tr>
<td></td>
<td>Yes (Colleagues and co-authors; Supervisors; University staff or committees)</td>
</tr>
<tr>
<td></td>
<td>Another Researcher Conducting Work on Predatory Journals</td>
</tr>
<tr>
<td>Has the experience of publishing in a potentially predatory journal affected how you evaluate future journals prior to submission? If yes, how?</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Yes (Not Specified How)</td>
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<td>Will Check Details about the Journal (Will be more careful; Check impact factor: Check if it has a DOI or ISSN; Check journal indexing; Check journal background/editor; Check peer review process; Check citations; Check Beall’s list; Check open source journals)</td>
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<td>Consult with Others (Colleagues; University management; Scientific committee; Supervisor)</td>
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<tr>
<td></td>
<td>Will Only Publish in Known/Prestigious/Authentic Journals</td>
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<td>Not Publish in Open Access Journals</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>Suggestions</td>
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*Note: DOI = Digital object identifier; ISSN = International Standard Serial Number*

**Data Sharing Statement**

Data screening and extraction forms, as well as random samples of journals, can be found on the OSF: [https://osf.io/jy3vh/](https://osf.io/jy3vh/). Each survey question, theme, and participant responses can be found in the OSF ([https://osf.io/xrstp/](https://osf.io/xrstp/)).
Discussion

This research is among the first to survey a geographically diverse group of biomedical researchers about their motivations and experiences of submitting to, and publishing in, presumed predatory journals. The most striking finding of our survey is that the vast majority of respondents reported receiving peer review feedback that they found to be substantive in nature. A strongly held belief is that predatory journals generally do not provide peer review and if they do it is frivolous and/or minimal and does not add to the scientific integrity of article; indeed this characteristic has been proposed as an important differentiator between presumed predatory journals and legitimate open access journals. Previous research confirms that articles published in predatory journals are of very low quality compared to research published in legitimate open access journals(7). To more fully understand the respondents’ peer reviews requires access to them. While more than a quarter of the respondents indicated their willingness to share their peer reviewers only two did so, and one was an article proof rather than a peer review.

Slightly less than half of the respondents indicated they did not pay an article processing fee to publish they article. This finding differs from previous assumptions about the business model of predatory journals and publishers and differs from most legitimate open access biomedical journals (https://bit.ly/2vrht1a). More than a half of the respondents identified as university professors or as researchers working in a research institute. Most of them indicated that their institutions do not have policies in place to deter them and others from submitting to predatory publishers and journals. The respondents also highlighted the pressure to publish as part of their promotion and tenure assessment. The qualitative analysis shed light on participants’ motivations
and experiences of publishing in a predatory journal. It was clear that many participants did not
agree the journal in which they published was predatory. We perceived many participants felt
strongly about this based on repetitive, emotionally-charged responses to the open-ended
questions.

Our survey differs from previous efforts. For example, we focused on authors publishing
biomedical articles whereas Kurt sought a broad spectrum of disciplines(10). Kurt’s results also
differed from ours in that of his four thematic results: social identify threat, unawareness, high
pressure, and lack of research proficiency, only high pressure to publish and unawareness were
also identified by us. Related to this is a result that professors reported submitting to predatory
journals to help students publish. In several parts of the world it is common for students to
complete manuscript-based PhDs and without publications it is not possible for them to graduate.
What is troubling here is that students may model their professor’s behavior and actively engage
in submitting to predatory journals as a goal from the inception of the careers.

Understanding the motivations that lead authors to submit to a predatory journal, whether
intentionally or unintentionally, is important from the perspective of both academic institutions
and research funders. We encourage stakeholders to examine the guidelines used at our research
institute to raise awareness and help deter prospective authors from submitting to predatory
journals. The policy is freely available using a creative commons license for easy reuse and
modification (see: https://osf.io/tvz4a/).

Our response rate was lower than that reported by others surveying this community(10,18). It is
possible that our initial survey was not conducted with an optimal temporal relationship to the
identified published article; there was a time lag between publication and sending out the survey.
We tried to counter this with our second survey although only achieved a modest increase in the response rate. It is possible that biomedical researchers are more reluctant to discuss presumed predatory journals compared to other disciplines. This likely requires additional inquiry. We found it difficult interpreting some free text survey responses perhaps signaling that English was not the first language of some respondents. We focused on biomedical researchers as this is the discipline most relevant to the co-author team, and because of the implications that publishing biomedical research can have on patients and clinical care. There is accumulating evidence that articles published in predatory journals are leaking into trusted sources of information, such as PubMed(19). It is unclear whether such articles end up in systematic reviews or clinical practice guidelines which impact clinical practice and health policies. This also requires additional investigation. Finally, our survey results need to be interpreted in light of them being based on self-reported responses.

While these results are informative, and provocative in places, adding to the knowledge base of presumed predatory publishers and journals, they do not provide a complete picture regarding the motivations to publish in presumed predatory journals. Knowledge of researcher motivations to publish in predatory journals is critical in order to be able to develop effective interventions to prevent future submissions. For example, if researchers are intentionally using these outlets as a means to pad their CVs, outreach and education is unlikely to effectively stop future submissions. However, educational outreach to hiring, promotion and tenure committees might be useful. In contrast, if researchers are being duped, or because of their lack of knowledge on issues with predatory journals, outreach and training may be an appropriate intervention. The outcomes from this work may have important implications for policy development and on actions to thwart predatory journals.
Addressing these, and other related questions, require resources. To date funders have not indicated their interest in funding investigations into predatory journals. This is unfortunate and perhaps short sighted. Data indicates a steep upward trajectory in the number of research articles published in predatory journals (even though this represents a very small fraction of the total number of biomedical publications). Some research ending up in predatory journals is funded. This is likely a bad investment in what for most funders is a limited fiscal budget. We recommend that funders give more serious consideration to funding research in predatory journals and act to promptly develop relevant policy. Other players also need to be involved in helping to weed out predatory publishers and journals(20).

Acknowledgements

We are grateful to Raymond Daniel who helped upload journal names and URL’s into DistillerSR for review and reference formatting.

Author Contributions

KDC, DM, MML conceived of the study idea. KDC, DM, AG, MML wrote the study protocol and designed the study survey. KDC, HR, DBR, AG identified the sample and extracted information related to corresponding authors. HR and KDC sent the e-mail to the sample of participants. KDC, AG, DBR conducted the study analysis. KDC, AG, DBR wrote the initial draft of the article. All authors provided critical feedback and agreed to the final version of the paper. DM provided funding for participant reimbursement costs.
References


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# Knowledge and motivations of researchers publishing in predatory journals: a survey

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<td>Date Submitted by the Author:</td>
<td>15-Nov-2018</td>
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<tr>
<td>Complete List of Authors:</td>
<td>Cobey, Kelly; Ottawa Hospital Research Institute, Centre for Journalology; University of Ottawa Faculty of Medicine, School of Epidemiology and Public Health Grudniewicz, Agnes; University of Ottawa Telfer School of Management; Institut du Savoir Monfort, Research Lalu, Manoj; Ottawa Hospital Research Institute, Clinical Epidemiology Rice, Danielle; Lady Davis Institute, Jewish General Hospital, Psychiatry; McGill University, Psychology Raffoul, Hana; University of Waterloo Faculty of Engineering, Biomedical Engineering Moher, David; Ottawa Hospital Research Institute, Ottawa Methods Centre</td>
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<td>Medical publishing and peer review</td>
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Knowledge and Motivations of Researchers Publishing in Predatory Journals: A Survey

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Abstract

Objectives: To develop effective interventions to prevent publishing in presumed predatory journals, it is helpful to understand the motivations and experiences of those who have published in these journals.

Design: We conducted an online survey delivered to two sets of corresponding authors. It contained basic demographic information, as well as questions about researchers' perceptions of publishing in the presumed predatory journal, type of article processing fees paid, and the quality of peer review received. The survey also asked six open-ended items about researchers' motivations and experiences.

Participants: Using Beall’s lists, we identified two groups of individuals who have published empirical articles in biomedical journals that were presumed to be predatory.

Results: Across both sets of corresponding authors, 82 of them partially responded (~14% response rate (11.4% (44/386) from the initial sample, 19.3% (38/197) from second sample) to our survey (N= 59 male, 72.8%). The top three countries represented were India (N=21, 25.9%), USA (N=17, 21.0%), and Ethiopia (N=5, 6.2%). Only 3 participants (3.9%) thought the journal they published in was predatory at the time of article submission. The majority of participants first encountered the journal via an e-mail invitation to submit an article (N= 32, 41.0%), or through searching online to find a journal with relevant scope (N=22, 28.2%). Most participants indicated their study received peer review (N=65, 83.3%), and that this was helpful and substantive (N=51, 79.7%). More than a third (N=32, 45.1%) indicated they did not pay fees to publish.

Conclusions: This work provides an important piece of evidence to inform policy to prevent future
research from being published in predatory journals. Our research suggests that common views about predatory journals (e.g., no peer review, fees to publish) may not always bear true, and that a grey zone between legitimate and presumed predatory journals exists.

**Strengths and Limitations of this Study**

- Survey specifically explored researcher motivations to publish in predatory journals
- Survey targeted biomedical researchers, where dissemination of preclinical and clinical outcomes may affect health services and patient care
- Survey is limited by a low response rate from participants

**Funding Statement**

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**Competing Interest Statement**

The authors do not have any competing interests.
Introduction

In the current scholarly landscape, the threat of presumed predatory journals (henceforth described as ‘predatory journals’) adds a further layer of complexity to the journal selection process. There is a sense that predatory journals exploit the open access (OA) publishing model (in which authors typically pay a fee to publish to ensure that their work is publicly and freely accessible), often by “spamming” researchers \(^{(1,2)}\) with offers of rapid publication at a much lower cost than legitimate OA journals, or without acknowledging upfront that accepted manuscripts are subject to publication fees \(^{(3,4)}\). Subsequently, it is suspected that these journals conduct frivolous (or no) peer review and often accept and publish manuscripts without any editing or editorial oversight whatsoever \(^{(5)}\).

Without action by relevant stakeholders, the potential for predatory journals to continue to penetrate the scholarly community is great \(^{(6,7)}\). Understanding what predatory journals are \(^{(8)}\) and what motivates researchers to submit to and publish in these journals is essential to preventing future submissions. Failure to address predatory journals means that they will continue to contribute to waste and inefficiency in dissemination. Public broadcasters in Germany undertook a review of researchers to determine the presence of German scientists publishing in predatory journals \(\text{https://www.the-scientist.com/news-opinion/german-scientists-frequently-publish-in-predatory-journals-64518}\). More than 5000 German scientists were reported as having published papers in predatory journals where the peer review process did not occur. Many of the projects were also receiving public funding. Further, a recent study examined more than 45,000 Italian CVs and found that approximately 5% contained research thought to be published in predatory journals \(^{(9)}\). A related survey of those researchers who published in predatory journals (response rate 54%) found that about 33% had colleagues suggest a predatory journal as an option for
For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

submission, 27% of researchers submitted their work to a predatory journal in response to an e-mail invitation, while 12% said their decision for where to submit their manuscript was linked to a conference presentation. A survey by Kurt(10) obtained responses from 96 authors who had published in 50 randomly selected journals on Beall’s journal list. Respondents were from a range of scientific fields, and the survey was predominantly composed of open-ended questions analysed qualitatively. Kurt reported that the reason these individuals published in predatory journals were captured in four themes: social identity threat, unawareness, high pressure, and lack of research proficiency. These findings provide initial evidence for how researchers come to submit their papers to predatory journals, but they do not explicitly consider a broad range of motivations. In addition, it is likely that there are nuances between scientific disciplines, which may have different norms and expectations pertaining to publishing scholarly activity.

Here, we seek to examine the motivations and experiences of biomedical researchers who have submitted to predatory journals. To address the prevalence of these and other motivations, we conducted a multi-national survey of researchers who published in predatory biomedical journals.

**Methods**

This study received ethical approval from the Ottawa Health Science Network Research Ethics Board (20170956-01H; see: https://osf.io/xaze9/). We conducted an online survey to obtain information about the motivations and experiences of researchers who have published in potentially predatory biomedical journals.

**Identifying participants**
Initially, we identified a sample of participants to send our survey to using an existing dataset of 1907 articles(7) that had been published in predatory biomedical journals. This sample was derived in a previous study examining a random selection of articles published in journals listed on Beall’s Lists of ‘potential, possible, or probable’ predatory journals(11). The dataset included the e-mail contact details for the corresponding authors of each paper when available. From the total group of 1907 articles, we selected those, and related author details, that were coded as having the following research designs: randomized controlled trial (N=94), observational cohort (N=180), or a pre-clinical research-based article (N=201). These study designs were selected to provide a combination of clinical and pre-clinical research, and in an effort to achieve a response rate of approximately 200 participants. We had anticipated a response rate of ~40% given rates of response from previous work(9,10). This sampling procedure is consistent with the methods described in the original study protocol that was posted prior to data collection on the Open Science Framework (OSF): https://osf.io/wgm7f/. A low response rate (see results) ensued. We considered that one reason for the modest response rate to the initial survey was that the authors sampled for our survey had been gathered in a study published in 2015. It was thought that obtaining a more recent sample of authors may result in a greater response rate. Therefore, after seeking a revision in ethical approval, we identified a second sample of potential authors of predatory journals to which to send our survey.

To identify this second sample, we used two approaches. Firstly, we used Beall’s lists to identify 100 additional journals. Although Beall removed his lists of predatory journals and publishers from his blog website in early 2017(12), his lists have been curated and updated anonymously at this website: https://beallslist.weebly.com/. We extracted all journals on Beall’s list of single
journal publishers on March 5th, 2018. Journal names and their corresponding URL (N=1310) were extracted and then their websites were screened in duplicate (KDC, HR, AG, DBR) to determine if they were active websites, if they published in English, and published research that was predominantly biomedical. We used the Medline definition to define biomedical journals as journals “predominantly devoted to reporting original investigations in the biomedical and health sciences, including research in the basic sciences; clinical trials of therapeutic agents; effectiveness of diagnostic or therapeutic techniques; or studies relating to the behavioural, epidemiological, or educational aspects of medicine”.(13) From the journals that met these inclusion criteria (N=158), we then took a random sample, using the [RAND] function in Excel, of 100 journals. Secondly, we obtained a random sample of 100 biomedical journals published by OMICS (a large publisher of predatory journals (14,15)). To do so, we selected all journals classified by OMICS as being “Clinical and Medical Sciences” journals. We de-duplicated journals that were listed more than once, which resulted in 500 unique journals, and using the [RAND] function in Excel, we randomly selected 100 journals.

From the combined random sample of the 200 journals obtained from the single journal publishers on Beall’s list (N=100) and from OMICS journals (N=100), reviewers in teams of two (DR, HR, AG, KDC) extracted the most recently posted research article (i.e., empirical article; we excluded commentaries, non-systematic reviews, editorials, etc.) from each of these journals. They subsequently extracted information including: the year of publication, the corresponding author’s name and e-mail address (if identifiable), the corresponding author’s country of origin (first listed in affiliation), the article title, and a classification of research type (clinical, preclinical, other). If there were no research articles available, the extracted research article did not provide accurate
contact details of the corresponding author, or journal website did not function, we replaced the journal with another randomly selected journal (N=30 journals replaced from 100 Beall’s list journals; N=14 journals replaced from OMICS list journals).

**Survey administration**

Online survey links were sent to both samples of participants from the primary investigator (KDC) using a standardized recruitment script (available on the OSF: https://osf.io/27bkm/) via a personalized email which specified the participants name, and the title of the identified article. We used MailMerge software to expedite this process. Participants were given two weeks to complete the survey. Participants received a standard follow-up e-mail reminder one week after the receiving their original invitation to participate.

**Survey**

The survey used (see: https://osf.io/27bkm/) was purpose built, administered in English, and distributed using SurveyMonkey(16). The survey began with participants completing online consent, and then several items intended to capture respondent demographics (e.g., age, gender, country of residency, education level, and research specialty area). Subsequently, the survey asked about respondents’ research status and publication record. Then, the survey asked respondents about any relevant institutional publication policies, and about whether respondents felt pressured by their institution to publish. Several items then addressed the respondents’ experience submitting and publishing the article we captured in our sample of predatory publications. Six open-ended questions then addressed the respondents’ decision to publish in the particular journal, when they
learned of its potentially predatory nature, and the career implications of the publication. No personal health information or personally identifying information was collected.

When participants completed the survey, they were provided with a generic research code, which they were instructed to send back to the project team via another SurveyMonkey link in which they also reported their e-mail address. The project team subsequently reimbursed participants for their time in the form of a $20CAD online Amazon gift card voucher. Following this method allowed us to successfully reimburse participants without them having to provide personal identifying information as part of their survey responses.

**Data analysis**

We report descriptive statistics for characteristics of the participants and summary statistics for quantitative items pertaining to researcher’s experiences, knowledge, and motivations. Data are reported using means or percentages as relevant. Given the relatively modest sample, in a deviation from our protocol, we do not provide comparative data illustrating findings by researcher rank, gender, discipline, or geographic location. For open-ended survey items, we used conventional content analysis(17). Without using preconceived categories, two researchers (AG, DBR) independently identified key themes in the data then discussed the themes generated until consensus was achieved for themes and subthemes. Key themes are summarized and presented using a narrative synthesis with illustrative quotes and using count data where relevant. Data was exported from the survey software into SPSS where means and percentages were calculated. Qualitative data was analyzed in Microsoft Word.
Patient and Public Involvement

The focus of this research was the motivations of authors to publish in predatory journals. As such we did not involve patients or the public in the development of the research question or outcomes.

Results

We sent our survey to a total of 583 potential participants. This number is lower than the combined number of articles identified from the original study database (randomized controlled trial (N=94), observational cohort (N=180), or a pre-clinical research-based article (N=201)) and the 200 additional sampled articles. This is because not all articles in the original study database contained corresponding e-mail addresses of authors, and in both samples several of the e-mails sent received bounce-back messages.

A total of 82 participants responded to our survey (44 from initial sample, 38 from second sample), although some participants did not complete all items, or chose to skip particular questions. This represents an overall response rate of approximately 14% (11.4% (44/386) from the initial sample, 19.3% (38/197) from second sample). Demographic characteristics of participants are described in Table 1. We first examined the quantitative survey item results (Table 2), then we examined qualitative survey results (Table 3).

Research institutions

Five percent (N=4) of survey respondents indicated that their institution has a policy against publishing in predatory journals at the time they published their article. Forty-one percent (N=32)
of respondents indicated they felt pressured to publish by their institution, and 25.3% (N=20) indicated their institution required them to publish a specific number of articles to be considered for tenure and promotion.

Participants’ perceptions and experience publishing

When participants were asked about the article sampled, 46.3% (N=38) indicated they did not think the journal they published in was predatory at the time of submission but that they do believe so now, 43.9% (N=36) felt the journal they published in was not predatory at the time of submission and maintain this view, while just 3.9% (N=3) indicated they were aware the journal was predatory at the time of submission. Participants indicated that they became aware of the journal they published in predominantly through direct e-mail invitations to submit from the journal (N=32, 41.0%), or through online searching for a relevant journal to which to submit (N=22, 28.2%). Participants indicated that they submitted their article via an online portal on the journal website (N=55, 70.5%) or via a direct e-mail to the journal (N=21, 26.9%). A small percent (N=2, 2.6%) could not remember how they submitted their article. Slightly more than a third (N=28, 35.4%) of participants indicated that they had submitted their article to another journal previously. Articles that had been submitted previously had been rejected by a mean of 2.04 (0.99 SD) journals. A little more than a quarter (N=21, 27.6%) of participants said they would publish in the journal in question again, while 36.6% (N=30) would not, and 30.5% (N=25) were uncertain.

Article processing charges
Seventy-one of the 82 participants (86.9%) responded to the question asking about the fee paid to publish their work. Participants responded in the currency they paid, and these rates were converted using Google to US dollars. This was done on June 7, 2018, and rates were rounded to the nearest dollar. As currency rates fluctuate, these values should only be considered as estimates. Of the 71 respondents, 45.1% (N=32) indicated they did not have to pay an article processing charge to publish their article. Those respondents who did pay a fee (N=39, 54.9%) paid between $30-4000 US dollars (Mean: $347.63; Median: $74; Sum: $24,682).

Peer review

The majority (N=65, 83.3%) of participants indicated that their paper underwent peer review, while 16.7% (N=12) indicated it did not. Among those participants who indicated their paper was peer reviewed, 79.7% (N= 51) indicated they felt the peer review was substantial and helpful, while 20.3% (N=13) indicated it was not. Twenty of the 64 participants (31.3%) who indicated that their article underwent peer review indicated that they would be willing to share the reviews with our research team. Just 2 eventually forwarded reviews (one of which was a paper proof not a review), and one author copied the review into the survey.
Table 1. Participant characteristics

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<td>27-77 (45.46±13.14)</td>
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</tr>
<tr>
<td><strong>Sex, N (%)</strong></td>
<td>Male: 59 (72.8) Female: 21 (25.9) Other: 1 (1.2)</td>
<td>81</td>
</tr>
<tr>
<td><strong>Top 3 Nationalities, N(%)</strong></td>
<td>India: 21 (25.9) USA: 17 (21.0) Ethiopia: 5 (6.2)</td>
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<tr>
<td><strong>Research discipline, N (%)</strong></td>
<td>Clinical research: 49 (59.8) Pre-clinical/basic research: 27 (32.9) Other: 6 (7.3)</td>
<td>82</td>
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<tr>
<td><strong>Research status, N (%)</strong></td>
<td>Undergraduate student: 1 (1.3) Master’s student: 5 (6.3) PhD student: 13 (16.3) Postdoctoral student: 3 (3.8) Assistant/Associate/Full Professor: 32 (40.0) Researcher at research institute: 13 (16.3) Researcher in private sector: 3 (3.8) Other: 10 (12.5)</td>
<td>80</td>
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<td><strong>Number of papers published within a year of the presumed predatory publication, N (%)</strong></td>
<td>0: 2 (2.6) 1-3: 39 (50.6) 4-6: 20 (26.0) 7+: 15 (19.5) Unknown: 1 (1.3)</td>
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### Table 2. Summary results of quantitative survey items

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<td>Did the primary institution you were based at the year you published your paper have a written policy for publishing that prohibited predatory journals? (N, %)</td>
<td>Yes: 4 (5.0) No: 53 (66.3) Don’t know: 23 (28.7)</td>
<td>80</td>
</tr>
<tr>
<td>Did the primary institution you were based at the year you published your paper make you feel pressured to publish (e.g., as part of a degree requirement or for promotion and/or tenure)? (N, %)</td>
<td>Yes: 32 (41.0) No: 46 (59.0)</td>
<td>78</td>
</tr>
<tr>
<td>Did the primary institution you were based the year you published your paper have a policy on whether faculty need a specific number of publications to be considered for promotion or tenure? (N, %)</td>
<td>Yes: 20 (25.3) No: 40 (46.5) Unsure: 9 (11.4) Not applicable (e.g. I was a student): 10 (12.7)</td>
<td>79</td>
</tr>
<tr>
<td><strong>Participants’ perceptions and experience publishing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We believe the journal in which you published may be a predatory journal. When submitting, were you:</td>
<td>Aware that it was predatory: 3 (3.9) Not aware that it was predatory, but now do consider it predatory: 38 (46.3) Not aware that it was predatory and continue to think it is not predatory: 36 (43.9)</td>
<td>77</td>
</tr>
<tr>
<td>How did you first become aware of this presumed predatory journal prior to submission?</td>
<td>E-mail invitation: 32 (41.0) A colleague: 10 (12.8) Supervisor/mentor: 5 (6.4) Reading the journal: 4 (5.1) Online searching for journal: 22 (28.2) Other: 5 (6.4)</td>
<td>78</td>
</tr>
<tr>
<td>Had the paper you published in this presumed predatory journal been submitted elsewhere previously?</td>
<td>Yes: 28 (35.4) No: 48 (60.8) Unsure: 3 (3.8)</td>
<td>79</td>
</tr>
<tr>
<td>How many times had the paper been submitted previously?</td>
<td>1: 8 (28.6) 2: 12 (42.9) 3: 4 (14.3) 4+: 2 (7.1) Don’t remember: 2 (7.1)</td>
<td>28</td>
</tr>
<tr>
<td>Question</td>
<td>Response</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>How was the paper submitted to the journal?</td>
<td>Online submission portal: 55 (70.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Via e-mail: 21 (26.9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other: 2 (2.6)</td>
<td></td>
</tr>
<tr>
<td>What factors or criteria influenced your decision to submit your manuscript to this journal instead of another journal (select all that apply)?</td>
<td>I felt it was the appropriate journal for my publication based on my normal process for selecting a journal (e.g., quality of journal, fit of topic/audience, etc.): 53 (67.1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adding to my CV quickly for hiring, promotion or tenure: 6 (7.6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adding to my CV quickly for a grant application: 0 (0.0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I needed to publish a paper quickly as part of my coursework/program: 17 (21.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General pressure to publish: 13 (16.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unable to publish the paper in other journals: 13 (16.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other: 4 (5.1)</td>
<td></td>
</tr>
<tr>
<td>Peer Review</td>
<td>Yes: 65 (83.3)</td>
<td></td>
</tr>
<tr>
<td>Did the paper receive peer review?</td>
<td>No: 12 (16.7)</td>
<td></td>
</tr>
<tr>
<td>Was the peer review substantial and helpful?</td>
<td>Yes: 51 (79.7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No: 13 (20.3)</td>
<td></td>
</tr>
<tr>
<td>Article processing charges</td>
<td>Research grant funding: 7 (9.6)</td>
<td></td>
</tr>
<tr>
<td>Where did you obtain money to pay the fee to publish?</td>
<td>University/employer research funding: 10 (13.7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Personal money: 29 (39.7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other: 3 (4.1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No fee paid: 24 (32.9)</td>
<td></td>
</tr>
<tr>
<td>Would you publish in this journal again in the future?</td>
<td>Yes: 21 (27.6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No: 30 (36.6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uncertain: 25 (30.5)</td>
<td></td>
</tr>
</tbody>
</table>
Qualitative Survey Results

Open-ended survey responses were categorized by survey question through content analysis. Themes and subthemes are presented by survey question in Table 3. Below, we provide a narrative synthesis of the data, including motivations and reasons for selecting the journal (survey questions 11 & 13), learning about the journal’s predatory nature (questions 12 & 15), career risks (questions 14), and evaluating journals for future submissions (question 16).

Motivations and Reasons for Selecting the Journal

When asked about factors that influenced their decision to submit to the selected journal, participants noted academic and professional factors (e.g., publishing pressure, for tenure); factors related to the journal (e.g., fit of paper with journal, perception of quality); factors related to the paper published (e.g., difficulty publishing elsewhere due to low originality of the research, previous rejections); desire to disseminate research; invitation from the journal; recommendation from a colleague; or personal factors (e.g., lack of mentorship, lack of knowledge, personal motivations to publish). In addition to general publishing pressure, seven respondents (8.5%) noted that they had to publish as part of degree requirements or did so to support the CV of a student. Fifteen participants (18.3%) also reported that they perceived the journal to be of quality for reasons such as: “reputation of the editor,” “the journal name seems familiar,” “well formatted manuscript submission platform,” “Journal based in United States, or “papers already published in this journal by U.S. and German scientists”. Others valued the ease and speed of publication and the journal’s low fees, as captured by one response: “Frustration with number of hours required to publish in standard journals after factoring in rejection.” One participant (1.2%) noted the importance of supporting new and small journals.
When asked about other motivations for publishing in the selected journal, several participants expressed frustration with “traditional” journals, noting very long ‘time to publication’ periods, high fees, unnecessarily critical peer review, and a bias toward publishing only the work of well-known researchers. One respondent captured the sentiment:

“Open access is great. Other journals have too much unjustified criticism in their peer review process. Quite often even excellent articles are rejected while mediocre or trivial papers of well-known scientists or people of their lab are published. Many people think that quality journals operate [with] nepotism.”

Learning about the Journal’s Predatory Nature

Twenty-four participants (28.3%) reported that our survey was the first time they learned the journal was potentially predatory. Thirteen participants (15.9%) disagreed that the journal was predatory and provided reasons such as: “I received peer review first,” “It took over 3 months before my manuscript was published,” and, “[The journal] is accepted by the university.” Those that did agree the journal was predatory, and learned about its nature prior to the survey, said they learned it was predatory because of hidden fees or unusual payment processes, publication processes (e.g., incoherent or non-critical peer review, atypical correspondence), a list of predatory journals, or a lack of journal indexing.

Participants were also asked if anyone discussed the predatory nature of the journal with them. Sixty-one participants (74.4%) said no. The remaining participants (N=21, 25.6%) were approached by colleagues and co-authors, supervisors, or university staff. One participant (1.2%)
responded they were approached “… only [by] close colleagues, who thought I had finished my research career.”, perhaps implying their perspectives of the risks of publishing in presumed predatory journals.

**Career Risks**

Most participants (N=54, 65.9%) reported not experiencing any career risks related to publishing in a potentially predatory journal. The remaining participants (N=28, 34.1%) noted that they were reprimanded by their supervisor, received few citations of their paper, experienced damage to their reputation, and missed the opportunity for helpful peer review. Two participants (2%) reported having attempted to retract the article by contacting the journal, but the articles were still published.

**Evaluating Future Journals Prior to Submission**

Nineteen participants (23.2%) reported that the experience of publishing in a presumed predatory journal has not changed how they evaluate journals prior to submitting other articles. The other participants (N=63, 76.8%) stated they would be more careful in future journal selection by checking: impact factor, a DOI or ISSN, journal indexing, background of editor, peer-review process, citations, Beall’s list, or with others (e.g., colleagues, university management, supervisors). Some participants shared that the experience has taught them to never pay for publication, to only publish in well-known journals, and to not publish in open-access journals.

**Table 3. Summary results of qualitative survey responses**

<table>
<thead>
<tr>
<th>Item</th>
<th>Themes (Subthemes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>What factors or criteria influenced your decision to submit your manuscript to this journal instead of another journal (e.g.,</td>
<td><strong>Academic and Professional Factors</strong> (General; General publishing pressure; As part of current job requirements; For tenure or promotion; Seeking employment/to get hired; Part</td>
</tr>
</tbody>
</table>

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml
<table>
<thead>
<tr>
<th>Factors Related to the Journal</th>
<th>Factors Related to the Paper Published</th>
<th>Factors Related to the Journal Compared to “traditional journals”</th>
</tr>
</thead>
</table>

**Academic and Professional Factors**
- Publication pressure
- Self-citation
- Part of being a researcher
- Salary increase
- Promotion in developing countries
- To increase program rankings

**Factors Related to the Journal**
- Compared to “traditional journals”
- Pressure to publish from trainee
- Perception or appearance of quality
- Journal is fast to publish
- Publication cost
- Ease of publishing
- Free editing
- Experience with journal

**Recommendation**
- From colleagues
- From Omni group conference

**Factors Related to the Journal**
- Paper fit with journal
- Perception or appearance of quality
- Journal is fast to publish
- Publication cost
- Ease of publishing
- Free editing
- Experience with journal

**Fees (Payment)**
- Payment

**Publication Process**
- Peer review
- Atypical correspondence
- Continued promotion emails

**List of Predatory Journals**

**Lack of Indexing**

**Disagree that Journal is Predatory**

**Concerns Raised by Others**

**Publication Process**
- Peer review
- Atypical correspondence
- Continued promotion emails

**List of Predatory Journals**

**Lack of Indexing**

**How did you first become aware that the journal you published in was potentially predatory in nature or may not be scientifically rigorous (e.g., I received no peer review although the editor said the article will be published within 24 hours)?**

**This Survey**
- No

**Concerns Raised by Others**
- No

**Fees (Payment)**
- No

**Publication Process**
- No

**List of Predatory Journals**

**Lack of Indexing**

**Did you see any career risks associated with publishing in this journal (e.g., getting caught by a colleague)?**

**No**

**Yes (Risks Not Specified)**

**Reprimanded by Supervisor**

**Personal Factors**
- Personal Satisfaction

**Academic and Professional Factors**
- Publication pressure
- Self-citation
- Part of being a researcher
- Salary increase
- Promotion in developing countries
- To increase program rankings

**Factors Related to the Paper Published**
- Topic fit with journal
- Low quality of manuscript
- Publishing unpublished work
- Student paper

**Factors Related to the Journal**
- Compared to “traditional journals”
- Pressure to publish from trainee
- Perception or appearance of quality
- Journal is fast to publish
- Publication cost
- Ease of publishing
- Free editing
- Experience with journal

**Desire to Disseminate**
- Wide readership
- Open access
- International scope

**Invitation from Journal**
- Promotional emails

**Personal Factors**
- Lack of mentorship in choosing journal
- Lack of knowledge (before predatory journals were common knowledge)
- Personal pressure/interest to publish

**Factors Related to the Paper Published**
- Topic fit with journal
- Low quality of manuscript
- Publishing unpublished work
- Student paper

**Factors Related to the Journal**
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- Pressure to publish from trainee
- Perception or appearance of quality
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- Ease of publishing
- Free editing
- Experience with journal

**Desire to Disseminate**
- Publishing before retirement
- Dissemination of work is easy because of the internet

**Supporting New or Small Journals**

**How did you first become aware that the journal you published in was potentially predatory in nature or may not be scientifically rigorous (e.g., I received no peer review although the editor said the article will be published within 24 hours)?**

**This Survey**
- No

**Concerns Raised by Others**
- No

**Fees (Payment)**
- No

**Publication Process**
- No

**List of Predatory Journals**

**Lack of Indexing**

**Did you see any career risks associated with publishing in this journal (e.g., getting caught by a colleague)?**

**No**

**Yes (Risks Not Specified)**

**Reprimanded by Supervisor**

**Personal Factors**
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**This Survey**
- No

**Concerns Raised by Others**
- No

**Fees (Payment)**
- No

**Publication Process**
- No

**List of Predatory Journals**

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**Did you see any career risks associated with publishing in this journal (e.g., getting caught by a colleague)?**

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**Yes (Risks Not Specified)**

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**How did you first become aware that the journal you published in was potentially predatory in nature or may not be scientifically rigorous (e.g., I received no peer review although the editor said the article will be published within 24 hours)?**

**This Survey**
- No

**Concerns Raised by Others**
- No

**Fees (Payment)**
- No

**Publication Process**
- No

**List of Predatory Journals**

**Lack of Indexing**

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**No**

**Yes (Risks Not Specified)**

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**Supporting New or Small Journals**
<table>
<thead>
<tr>
<th>Few Citations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damage to Reputation</td>
</tr>
<tr>
<td>Retraction (Published even after retraction; Requested retraction)</td>
</tr>
<tr>
<td>Continued Emails from Journal</td>
</tr>
<tr>
<td>Missed Opportunity for Peer Review</td>
</tr>
</tbody>
</table>

| Has anyone else discussed the potentially predatory nature of this journal with you (e.g. the paper’s co-authors, your dean, supervisor, tenure & promotions committee)? |
| No |
| Yes (Individual Not Specified) |
| Yes (Colleagues and co-authors; Supervisors; University staff or committees) |
| Another Researcher Conducting Work on Predatory Journals |

| Has the experience of publishing in a potentially predatory journal affected how you evaluate future journals prior to submission? If yes, how? |
| No |
| Yes (Not Specified How) |
| Will Check Details about the Journal (Will be more careful; Check impact factor: Check if it has a DOI or ISSN; Check journal indexing; Check journal background/editor; Check peer review process; Check citations; Check Beall’s list; Check open source journals) |
| Consult with Others (Colleagues; University management; Scientific committee; Supervisor) |
| Will Only Publish in Known/Prestigious/Authentic Journals |
| Not Publish in Open Access Journals |
| Fees |
| Suggestions |

Note: DOI = Digital object identifier; ISSN = International Standard Serial Number

Data Sharing Statement

Data screening and extraction forms, as well as random samples of journals, can be found on the OSF: [https://osf.io/jy3vh/](https://osf.io/jy3vh/). Each survey question, theme, and participant responses can be found in the OSF ([https://osf.io/xrstp/](https://osf.io/xrstp/)).
Discussion

This research is among the first to survey a geographically diverse group of biomedical researchers about their motivations and experiences of submitting to, and publishing in, presumed predatory journals. The most striking finding of our survey is that the vast majority of respondents reported receiving peer review feedback that they found to be substantive in nature. A strongly held belief is that predatory journals generally do not provide peer review and if they do it is frivolous and/or minimal and does not add to the scientific integrity of article; indeed this characteristic has been proposed as an important differentiator between presumed predatory journals and legitimate open access journals. Previous research confirms that articles published in predatory journals are of very low quality compared to research published in legitimate open access journals.(7) To more fully understand the respondents’ peer reviews requires access to them. While more than a quarter of the respondents indicated their willingness to share their peer reviewers only two did so, and one was an article proof rather than a peer review.

Slightly less than half of the respondents indicated they did not pay an article processing fee to publish they article. This finding differs from previous assumptions about the business model of predatory journals and publishers and differs from most legitimate open access biomedical journals (https://bit.ly/2vrht1a). More than a half of the respondents identified as university professors or as researchers working in a research institute. Most of them indicated that their institutions do not have policies in place to deter them and others from submitting to predatory publishers and journals. The respondents also highlighted the pressure to publish as part of their promotion and tenure assessment. The qualitative analysis shed light on participants’ motivations and experiences of publishing in a predatory journal. It was clear that many participants did not agree the journal
in which they published was predatory. We perceived many participants felt strongly about this based on repetitive, emotionally-charged responses to the open-ended questions.

Our survey differs from previous efforts. For example, we focused on authors publishing biomedical articles whereas Kurt sought a broad spectrum of disciplines(10). Kurt’s results also differed from ours in that of his four thematic results: social identify threat, unawareness, high pressure, and lack of research proficiency, only high pressure to publish and unawareness were also identified by us and two of these two motivators have also been identified by others (Gopalakrishnan Saroja S, Santhosh Kumar JU, Hareesha AS. India’s scientific publication in predatory journals: need for regulating quality of Indian science and education.(18). Among 480 researchers from India who were identified as having published in a presumed predatory journal, more than 70% of them reported having pressure to publish research articles to facilitate career promotions and job security. Only 10% of respondents reported being aware that their relevant article was published in a predatory journal, however, more than 70% of them were not willing to answer this question. In addition to professors feeling pressure to publish, many reported submitting to presumed predatory journals to help students publish. In several parts of the world it is common for students to complete manuscript-based PhDs and without publications it is not possible for them to graduate. In the online survey of researchers from India, an institutional requirement of between one and three publications as a criterion for their PhD defense was reported by 90% of the respondents. What is troubling here is that students may model their professor’s behavior and actively engage in submitting to predatory journals as a goal from the inception of their career. Understanding the motivations that lead authors to submit to a predatory journal, whether intentionally or unintentionally, is important from the perspective of both academic institutions and research funders. We encourage stakeholders to examine the guidelines used at
our research institute to raise awareness and help deter prospective authors from submitting to predatory journals. The policy is freely available using a creative commons license for easy reuse and modification (see: https://osf.io/tvz4a/).

Our response rate was lower than that reported by others surveying this community(9,10). It is possible that our initial survey was not conducted with an optimal temporal relationship to the identified published article; there was a time lag between publication and sending out the survey. We tried to counter this with our second survey although only achieved a modest increase in the response rate. It is possible that biomedical researchers are more reluctant to discuss presumed predatory journals compared to other disciplines. This likely requires additional inquiry. We found it difficult interpreting some free text survey responses perhaps signaling that English was not the first language of some respondents. It is possible that our results are influenced by cognitive bias given the nature of our questions and the content we are inquiring about, namely, presumed predatory journals. It is difficult to adjust survey responses for such bias. Future surveys as to the motivations for publishing in these journals should develop questions that minimize or avoid cognitive bias. We focused on biomedical researchers as this is the discipline most relevant to the co-author team, and because of the implications that publishing biomedical research can have on patients and clinical care. There is accumulating evidence that articles published in predatory journals are leaking into trusted sources of information, such as PubMed(19). It is unclear whether such articles end up in systematic reviews or clinical practice guidelines which impact clinical practice and health policies. This also requires additional investigation. Finally, our survey results need to be interpreted in light of them being based on self-reported responses.

While these results are informative, and provocative in places, adding to the knowledge base of presumed predatory publishers and journals, they do not provide a complete picture regarding the
motivations to publish in presumed predatory journals. Knowledge of researcher motivations to publish in predatory journals is critical in order to be able to develop effective interventions to prevent future submissions. For example, if researchers are intentionally using these outlets as a means to pad their CVs, outreach and education is unlikely to effectively stop future submissions. However, educational outreach to hiring, promotion and tenure committees might be useful. In contrast, if researchers are being duped, or because of their lack of knowledge on issues with predatory journals, outreach and training may be an appropriate intervention. The outcomes from this work may have important implications for policy development and on actions to thwart presumed predatory journals.

Addressing these, and other related questions, require resources. To date funders have not indicated their interest in funding investigations into predatory journals. This is unfortunate and perhaps short sighted. Data indicates a steep upward trajectory in the number of research articles published in predatory journals (even though this represents a very small fraction of the total number of biomedical publications). Some research ending up in predatory journals is funded. This is likely a bad investment in what for most funders is a limited fiscal budget. We recommend that funders give more serious consideration to funding research in predatory journals and act to promptly develop relevant policy. Other players also need to be involved in helping to weed out predatory publishers and journals(6).

Acknowledgements

We are grateful to Raymond Daniel who helped upload journal names and URL’s into DistillerSR for review and reference formatting.
Author Contributions

KDC, DM, MML conceived of the study idea. KDC, DM, AG, MML wrote the study protocol and designed the study survey. KDC, HR, DBR, AG identified the sample and extracted information related to corresponding authors. HR and KDC sent the e-mail to the sample of participants. KDC, AG, DBR conducted the study analysis. KDC, AG, DBR wrote the initial draft of the article. All authors provided critical feedback and agreed to the final version of the paper. DM provided funding for participant reimbursement costs.

References


Knowledge and motivations of researchers publishing in presumed predatory journals: a survey

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<th><em>BMJ Open</em></th>
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<tr>
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<td>Article Type:</td>
<td>Research</td>
</tr>
<tr>
<td>Date Submitted by the Author:</td>
<td>09-Dec-2018</td>
</tr>
<tr>
<td>Complete List of Authors:</td>
<td>Cobey, Kelly; Ottawa Hospital Research Institute, Centre for Journalology; University of Ottawa Faculty of Medicine, School of Epidemiology and Public Health Grudniewicz, Agnes; University of Ottawa Telfer School of Management; Institut du Savoir Monfort, Research Lalu, Manoj; Ottawa Hospital Research Institute, Clinical Epidemiology Rice, Danielle; Lady Davis Institute, Jewish General Hospital, Psychiatry; McGill University, Psychology Raffoul, Hana; University of Waterloo Faculty of Engineering, Biomedical Engineering Moher, David; Ottawa Hospital Research Institute, Ottawa Methods Centre</td>
</tr>
<tr>
<td>Primary Subject Heading:</td>
<td>Medical publishing and peer review</td>
</tr>
<tr>
<td>Secondary Subject Heading:</td>
<td>Medical publishing and peer review</td>
</tr>
<tr>
<td>Keywords:</td>
<td>Predatory journals, Motivations to publish, Survey, Corresponding authors</td>
</tr>
</tbody>
</table>
Knowledge and Motivations of Researchers Publishing in Presumed Predatory Journals: A Survey

Kelly D Cobey¹,²,³,*, Agnes Grudniewicz⁴,⁵,⁶, Manoj M Lalu¹,⁷, Danielle B Rice¹,⁸, Hana Raffoul¹,⁹, David Moher¹,²*

¹Centre for Journalology, Clinical Epidemiology Program, The Ottawa Hospital Research Institute, Ottawa, Canada
²School of Epidemiology and Public Health, Faculty of Medicine, University of Ottawa, Ottawa, Canada
³Department of Psychology, School of Natural Sciences, University of Stirling, Scotland
⁴Telfer School of Management, University of Ottawa, Ottawa, Canada
⁵Institut du Savoir Montfort - Research, Ottawa, Canada
⁶Bruyère Research Institute, Ottawa, Canada
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Abstract

Objectives: To develop effective interventions to prevent publishing in presumed predatory journals, it is helpful to understand the motivations and experiences of those who have published in these journals.

Design: We conducted an online survey delivered to two sets of corresponding authors. It contained basic demographic information, as well as questions about researchers' perceptions of publishing in the presumed predatory journal, type of article processing fees paid, and the quality of peer review received. The survey also asked six open-ended items about researchers' motivations and experiences.

Participants: Using Beall’s lists, we identified two groups of individuals who have published empirical articles in biomedical journals that were presumed to be predatory.

Results: Across both sets of corresponding authors, 82 of them partially responded (~14% response rate (11.4% (44/386) from the initial sample, 19.3% (38/197) from second sample) to our survey (N= 59 male, 72.8%). The top three countries represented were India (N=21, 25.9%), USA (N=17, 21.0%), and Ethiopia (N=5, 6.2%). Only 3 participants (3.9%) thought the journal they published in was predatory at the time of article submission. The majority of participants first encountered the journal via an e-mail invitation to submit an article (N= 32, 41.0%), or through searching online to find a journal with relevant scope (N=22, 28.2%). Most participants indicated their study received peer review (N=65, 83.3%), and that this was helpful and substantive (N=51, 79.7%). More than a third (N=32, 45.1%) indicated they did not pay fees to publish.
Conclusions: This work provides an important piece of evidence to inform policy to prevent future research from being published in predatory journals. Our research suggests that common views about predatory journals (e.g., no peer review, fees to publish) may not always bear true, and that a grey zone between legitimate and presumed predatory journals exists.

Strengths and Limitations of this Study

- Survey specifically explored researcher motivations to publish in predatory journals
- Survey targeted biomedical researchers, where dissemination of preclinical and clinical outcomes may affect health services and patient care
- Survey is limited by a low response rate from participants

Funding Statement

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Competing Interest Statement

The authors do not have any competing interests.
Introduction

In the current scholarly landscape, the threat of presumed predatory journals (henceforth described as ‘predatory journals’) adds a further layer of complexity to the journal selection process. There is a sense that predatory journals exploit the open access (OA) publishing model (in which authors typically pay a fee to publish to ensure that their work is publicly and freely accessible), often by “spamming” researchers(1,2) with offers of rapid publication at a much lower cost than legitimate OA journals, or without acknowledging upfront that accepted manuscripts are subject to publication fees(3,4). Subsequently, it is suspected that these journals conduct frivolous (or no) peer review and often accept and publish manuscripts without any editing or editorial oversight whatsoever(5).

Without action by relevant stakeholders, the potential for predatory journals to continue to penetrate the scholarly community is great(6,7). Understanding what predatory journals are(8) and what motivates researchers to submit to and publish in these journals is essential to preventing future submissions. Failure to address predatory journals means that they will continue to contribute to waste and inefficiency in dissemination. Public broadcasters in Germany undertook a review of researchers to determine the presence of German scientists publishing in predatory journals (https://www.the-scientist.com/news-opinion/german-scientists-frequently-publish-in-predatory-journals-64518). More than 5000 German scientists were reported as having published papers in predatory journals where the peer review process did not occur. Many of the projects were also receiving public funding. Further, a recent study examined more than 45,000 Italian CVs and found that approximately 5% contained research thought to be published in predatory journals(9). A related survey of those researchers who published in predatory journals (response rate 54%) found that about 33% had colleagues suggest a predatory journal as an option for
For peer review only

submission, 27% of researchers submitted their work to a predatory journal in response to an e-mail invitation, while 12% said their decision for where to submit their manuscript was linked to a conference presentation. A survey by Kurt(10) obtained responses from 96 authors who had published in 50 randomly selected journals on Beall’s journal list. Respondents were from a range of scientific fields, and the survey was predominantly composed of open-ended questions analysed qualitatively. Kurt reported that the reason these individuals published in predatory journals were captured in four themes: social identify threat, unawareness, high pressure, and lack of research proficiency. These findings provide initial evidence for how researchers come to submit their papers to predatory journals, but they do not explicitly consider a broad range of motivations. In addition, it is likely that there are nuances between scientific disciplines, which may have different norms and expectations pertaining to publishing scholarly activity.

Here, we seek to examine the motivations and experiences of biomedical researchers who have submitted to predatory journals. To address the prevalence of these and other motivations, we conducted a multi-national survey of researchers who published in predatory biomedical journals.

**Methods**

This study received ethical approval from the Ottawa Health Science Network Research Ethics Board (20170956-01H; see: https://osf.io/xaze9/). We conducted an online survey to obtain information about the motivations and experiences of researchers who have published in potentially predatory biomedical journals.

*Identifying participants*
Initially, we identified a sample of participants to send our survey to using an existing dataset of 1907 articles(7) that had been published in predatory biomedical journals. This sample was derived in a previous study examining a random selection of articles published in journals listed on Beall’s Lists of ‘potential, possible, or probable’ predatory journals(11). The dataset included the e-mail contact details for the corresponding authors of each paper when available. From the total group of 1907 articles, we selected those, and related author details, that were coded as having the following research designs: randomized controlled trial (N=94), observational cohort (N=180), or a pre-clinical research-based article (N=201). These study designs were selected to provide a combination of clinical and pre-clinical research, and in an effort to achieve a response rate of approximately 200 participants. We had anticipated a response rate of ~40% given rates of response from previous work(9,10). This sampling procedure is consistent with the methods described in the original study protocol that was posted prior to data collection on the Open Science Framework (OSF): https://osf.io/wgm7f. A low response rate (see results) ensued. We considered that one reason for the modest response rate to the initial survey was that the authors sampled for our survey had been gathered in a study published in 2015. It was thought that obtaining a more recent sample of authors may result in a greater response rate. Therefore, after seeking a revision in ethical approval, we identified a second sample of potential authors of predatory journals to which to send our survey.

To identify this second sample, we used two approaches. Firstly, we used Beall’s lists to identify 100 additional journals. Although Beall removed his lists of predatory journals and publishers from his blog website in early 2017(12), his lists have been curated and updated anonymously at this website: https://beallslist.weebly.com/. We extracted all journals on Beall’s list of single
journal publishers on March 5th, 2018. Journal names and their corresponding URL (N=1310) were extracted and then their websites were screened in duplicate (KDC, HR, AG, DBR) to determine if they were active websites, if they published in English, and published research that was predominantly biomedical. We used the Medline definition to define biomedical journals as journals “predominantly devoted to reporting original investigations in the biomedical and health sciences, including research in the basic sciences; clinical trials of therapeutic agents; effectiveness of diagnostic or therapeutic techniques; or studies relating to the behavioural, epidemiological, or educational aspects of medicine”.(13) From the journals that met these inclusion criteria (N=158), we then took a random sample, using the [RAND] function in Excel, of 100 journals. Secondly, we obtained a random sample of 100 biomedical journals published by OMICS (a large publisher of predatory journals (14,15)). To do so, we selected all journals classified by OMICS as being “Clinical and Medical Sciences” journals. We de-duplicated journals that were listed more than once, which resulted in 500 unique journals, and using the [RAND] function in Excel, we randomly selected 100 journals.

From the combined random sample of the 200 journals obtained from the single journal publishers on Beall’s list (N=100) and from OMICS journals (N=100), reviewers in teams of two (DR, HR, AG, KDC) extracted the most recently posted research article (i.e., empirical article; we excluded commentaries, non-systematic reviews, editorials, etc.) from each of these journals. They subsequently extracted information including: the year of publication, the corresponding author’s name and e-mail address (if identifiable), the corresponding author’s country of origin (first listed in affiliation), the article title, and a classification of research type (clinical, preclinical, other). If there were no research articles available, the extracted research article did not provide accurate
contact details of the corresponding author, or journal website did not function, we replaced the journal with another randomly selected journal (N=30 journals replaced from 100 Beall’s list journals; N=14 journals replaced from OMICS list journals).

Survey administration

Online survey links were sent to both samples of participants from the primary investigator (KDC) using a standardized recruitment script (available on the OSF: https://osf.io/27bkm/) via a personalized email which specified the participants name, and the title of the identified article. We used MailMerge software to expedite this process. Participants were given two weeks to complete the survey. Participants received a standard follow-up e-mail reminder one week after the receiving their original invitation to participate.

Survey

The survey used (see: https://osf.io/27bkm/) was purpose built, administered in English, and distributed using SurveyMonkey(16). The survey began with participants completing online consent, and then several items intended to capture respondent demographics (e.g., age, gender, country of residency, education level, and research specialty area). Subsequently, the survey asked about respondents’ research status and publication record. Then, the survey asked respondents about any relevant institutional publication policies, and about whether respondents felt pressured by their institution to publish. Several items then addressed the respondents’ experience submitting and publishing the article we captured in our sample of predatory publications. Six open-ended questions then addressed the respondents’ decision to publish in the particular journal, when they
learned of its potentially predatory nature, and the career implications of the publication. No personal health information or personally identifying information was collected.

When participants completed the survey, they were provided with a generic research code, which they were instructed to send back to the project team via another SurveyMonkey link in which they also reported their e-mail address. The project team subsequently reimbursed participants for their time in the form of a $20CAD online Amazon gift card voucher. Following this method allowed us to successfully reimburse participants without them having to provide personal identifying information as part of their survey responses.

Data analysis

We report descriptive statistics for characteristics of the participants and summary statistics for quantitative items pertaining to researcher’s experiences, knowledge, and motivations. Data are reported using means or percentages as relevant. Given the relatively modest sample, in a deviation from our protocol, we do not provide comparative data illustrating findings by researcher rank, gender, discipline, or geographic location. For open-ended survey items, we used conventional content analysis(17). Without using preconceived categories, two researchers (AG, DBR) independently identified key themes in the data then discussed the themes generated until consensus was achieved for themes and subthemes. Key themes are summarized and presented using a narrative synthesis with illustrative quotes and using count data where relevant. Data was exported from the survey software into SPSS where means and percentages were calculated. Qualitative data was analyzed in Microsoft Word.
Patient and Public Involvement

The focus of this research was the motivations of authors to publish in predatory journals. As such we did not involve patients or the public in the development of the research question or outcomes.

Results

We sent our survey to a total of 583 potential participants. This number is lower than the combined number of articles identified from the original study database (randomized controlled trial (N=94), observational cohort (N=180), or a pre-clinical research-based article (N=201)) and the 200 additional sampled articles. This is because not all articles in the original study database contained corresponding e-mail addresses of authors, and in both samples several of the e-mails sent received bounce-back messages.

A total of 82 participants responded to our survey (44 from initial sample, 38 from second sample), although some participants did not complete all items, or chose to skip particular questions. This represents an overall response rate of approximately 14% (11.4% (44/386) from the initial sample, 19.3% (38/197) from second sample). Demographic characteristics of participants are described in Table 1. We first examined the quantitative survey item results (Table 2), then we examined qualitative survey results (Table 3).

Research institutions

Five percent (N=4) of survey respondents indicated that their institution has a policy against publishing in predatory journals at the time they published their article. Forty-one percent (N=32)
of respondents indicated they felt pressured to publish by their institution, and 25.3% (N=20) indicated their institution required them to publish a specific number of articles to be considered for tenure and promotion.

Participants’ perceptions and experience publishing

When participants were asked about the article sampled, 46.3% (N=38) indicated they did not think the journal they published in was predatory at the time of submission but that they do believe so now, 43.9% (N=36) felt the journal they published in was not predatory at the time of submission and maintain this view, while just 3.9% (N=3) indicated they were aware the journal was predatory at the time of submission. Participants indicated that they became aware of the journal they published in predominantly through direct e-mail invitations to submit from the journal (N=32, 41.0%), or through online searching for a relevant journal to which to submit (N=22, 28.2%). Participants indicated that they submitted their article via an online portal on the journal website (N=55, 70.5%) or via a direct e-mail to the journal (N=21, 26.9%). A small percent (N=2, 2.6%) could not remember how they submitted their article. Slightly more than a third (N=28, 35.4%) of participants indicated that they had submitted their article to another journal previously. Articles that had been submitted previously had been rejected by a mean of 2.04 (0.99 SD) journals. A little more than a quarter (N=21, 27.6%) of participants said they would publish in the journal in question again, while 36.6% (N=30) would not, and 30.5% (N=25) were uncertain.

Article processing charges
Seventy-one of the 82 participants (86.9%) responded to the question asking about the fee paid to publish their work. Participants responded in the currency they paid, and these rates were converted using Google to US dollars. This was done on June 7, 2018, and rates were rounded to the nearest dollar. As currency rates fluctuate, these values should only be considered as estimates.

Of the 71 respondents, 45.1% (N=32) indicated they did not have to pay an article processing charge to publish their article. Those respondents who did pay a fee (N=39, 54.9%) paid between $30-4000 US dollars (Mean: $347.63; Median: $74; Sum: $24,682).

**Peer review**

The majority (N=65, 83.3%) of participants indicated that their paper underwent peer review, while 16.7% (N=12) indicated it did not. Among those participants who indicated their paper was peer reviewed, 79.7% (N= 51) indicated they felt the peer review was substantial and helpful, while 20.3% (N=13) indicated it was not. Twenty of the 64 participants (31.3%) who indicated that their article underwent peer review indicated that they would be willing to share the reviews with our research team. Just 2 eventually forwarded reviews (one of which was a paper proof not a review), and one author copied the review into the survey.
### Table 1. Participant characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Sample</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age range (Mean±SD)</strong></td>
<td>27-77 (45.46±13.14)</td>
<td>80</td>
</tr>
<tr>
<td><strong>Sex, N (%)</strong></td>
<td>Male: 59 (72.8)  Female: 21 (25.9)  Other: 1 (1.2)</td>
<td>81</td>
</tr>
<tr>
<td><strong>Top 3 Nationalities, N(%)</strong></td>
<td>India: 21 (25.9)  USA: 17 (21.0)  Ethiopia: 5 (6.2)</td>
<td>81</td>
</tr>
<tr>
<td><strong>Research discipline, N (%)</strong></td>
<td>Clinical research: 49 (59.8)  Pre-clinical/basic research: 27 (32.9)  Other: 6 (7.3)</td>
<td>82</td>
</tr>
<tr>
<td><strong>Research status, N (%)</strong></td>
<td>Undergraduate student: 1 (1.3)  Master’s student: 5 (6.3)  PhD student: 13 (16.3)  Postdoctoral student: 3 (3.8)  Assistant/Associate/Full Professor: 32 (40.0)  Researcher at research institute: 13 (16.3)  Researcher in private sector: 3 (3.8)  Other: 10 (12.5)</td>
<td>80</td>
</tr>
<tr>
<td><strong>Number of papers published within a year of the presumed predatory publication, N (%)</strong></td>
<td>0: 2 (2.6)  1-3: 39 (50.6)  4-6: 20 (26.0)  7+: 15 (19.5)  Unknown: 1 (1.3)</td>
<td>77</td>
</tr>
</tbody>
</table>
**Table 2. Summary results of quantitative survey items**

<table>
<thead>
<tr>
<th>Item</th>
<th>Response</th>
<th>Total N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Institutional items</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Did the primary institution you were based at the year you published your paper have a written policy for publishing that prohibited predatory journals? (N, %) | Yes: 4 (5.0)  
No: 53 (66.3)  
Don’t know: 23 (28.7) | 80      |
| Did the primary institution you were based at the year you published your paper make you feel pressured to publish (e.g., as part of a degree requirement or for promotion and/or tenure)? (N, %) | Yes: 32 (41.0)  
No: 46 (59.0) | 78      |
| Did the primary institution you were based the year you published your paper have a policy on whether faculty need a specific number of publications to be considered for promotion or tenure? (N, %) | Yes: 20 (25.3)  
No: 40 (46.5)  
Unsure: 9 (11.4)  
Not applicable (e.g. I was a student): 10 (12.7) | 79      |
| **Participants’ perceptions and experience publishing**              |                                               |         |
| We believe the journal in which you published may be a predatory journal. When submitting, were you: | Aware that it was predatory: 3 (3.9)  
Not aware that it was predatory, but now do consider it predatory: 38 (46.3)  
Not aware that it was predatory and continue to think it is not predatory: 36 (43.9) |         |
| How did you first become aware of this presumed predatory journal prior to submission? | E-mail invitation: 32 (41.0)  
A colleague: 10 (12.8)  
Supervisor/mentor: 5 (6.4)  
Reading the journal: 4 (5.1)  
Online searching for journal: 22 (28.2)  
Other: 5 (6.4) | 78      |
| Had the paper you published in this presumed predatory journal been submitted elsewhere previously? | Yes: 28 (35.4)  
No: 48 (60.8)  
Unsure: 3 (3.8) | 79      |
| How many times had the paper been submitted previously?             | 1: 8 (28.6)  
2: 12 (42.9)  
3: 4 (14.3)  
4+: 2 (7.1)  
Don’t remember: 2 (7.1) | 28      |
### How was the paper submitted to the journal?

<table>
<thead>
<tr>
<th>Method</th>
<th>Count (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online submission portal</td>
<td>55 (70.5)</td>
</tr>
<tr>
<td>Via e-mail</td>
<td>21 (26.9)</td>
</tr>
<tr>
<td>Other</td>
<td>2 (2.6)</td>
</tr>
</tbody>
</table>

### What factors or criteria influenced your decision to submit your manuscript to this journal instead of another journal (select all that apply)?

- I felt it was the appropriate journal for my publication based on my normal process for selecting a journal (e.g., quality of journal, fit of topic/audience, etc.): 53 (67.1)
- Adding to my CV quickly for hiring, promotion or tenure: 6 (7.6)
- Adding to my CV quickly for a grant application: 0 (0.0)
- I needed to publish a paper quickly as part of my coursework/program: 17 (21.5)
- General pressure to publish: 13 (16.5)
- Unable to publish the paper in other journals: 13 (16.5)
- Other: 4 (5.1)

### Peer Review

- Did the paper receive peer review?  
  - Yes: 65 (83.3)  
  - No: 12 (16.7)

- Was the peer review substantial and helpful?  
  - Yes: 51 (79.7)  
  - No: 13 (20.3)

### Article processing charges

- Where did you obtain money to pay the fee to publish?  
  - Research grant funding: 7 (9.6)  
  - University/employer research funding: 10 (13.7)  
  - Personal money: 29 (39.7)  
  - Other: 3 (4.1)  
  - No fee paid: 24 (32.9)

- Would you publish in this journal again in the future?  
  - Yes: 21 (27.6)  
  - No: 30 (36.6)  
  - Uncertain: 25 (30.5)
Qualitative Survey Results

Open-ended survey responses were categorized by survey question through content analysis. Themes and subthemes are presented by survey question in Table 3. Below, we provide a narrative synthesis of the data, including motivations and reasons for selecting the journal (survey questions 11 & 13), learning about the journal’s predatory nature (questions 12 & 15), career risks (questions 14), and evaluating journals for future submissions (question 16).

Motivations and Reasons for Selecting the Journal

When asked about factors that influenced their decision to submit to the selected journal, participants noted academic and professional factors (e.g., publishing pressure, for tenure); factors related to the journal (e.g., fit of paper with journal, perception of quality); factors related to the paper published (e.g., difficulty publishing elsewhere due to low originality of the research, previous rejections); desire to disseminate research; invitation from the journal; recommendation from a colleague; or personal factors (e.g., lack of mentorship, lack of knowledge, personal motivations to publish). In addition to general publishing pressure, seven respondents (8.5%) noted that they had to publish as part of degree requirements or did so to support the CV of a student. Fifteen participants (18.3%) also reported that they perceived the journal to be of quality for reasons such as: “reputation of the editor,” “the journal name seems familiar,” “well formatted manuscript submission platform,” “Journal based in United States, or “papers already published in this journal by U.S. and German scientists”. Others valued the ease and speed of publication and the journal’s low fees, as captured by one response: “Frustration with number of hours required to publish in standard journals after factoring in rejection.” One participant (1.2%) noted the importance of supporting new and small journals.
When asked about other motivations for publishing in the selected journal, several participants expressed frustration with “traditional” journals, noting very long ‘time to publication’ periods, high fees, unnecessarily critical peer review, and a bias toward publishing only the work of well-known researchers. One respondent captured the sentiment:

“Open access is great. Other journals have too much unjustified criticism in their peer review process. Quite often even excellent articles are rejected while mediocre or trivial papers of well-known scientists or people of their lab are published. Many people think that quality journals operate [with] nepotism.”

Learning about the Journal’s Predatory Nature

Twenty-four participants (28.3%) reported that our survey was the first time they learned the journal was potentially predatory. Thirteen participants (15.9%) disagreed that the journal was predatory and provided reasons such as: “I received peer review first,” “It took over 3 months before my manuscript was published,” and, “[The journal] is accepted by the university.” Those that did agree the journal was predatory, and learned about its nature prior to the survey, said they learned it was predatory because of hidden fees or unusual payment processes, publication processes (e.g., incoherent or non-critical peer review, atypical correspondence), a list of predatory journals, or a lack of journal indexing.

Participants were also asked if anyone discussed the predatory nature of the journal with them. Sixty-one participants (74.4%) said no. The remaining participants (N=21, 25.6%) were approached by colleagues and co-authors, supervisors, or university staff. One participant (1.2%)
responded they were approached “… only [by] close colleagues, who thought I had finished my research career.”, perhaps implying their perspectives of the risks of publishing in presumed predatory journals.

**Career Risks**

Most participants (N=54, 65.9%) reported not experiencing any career risks related to publishing in a potentially predatory journal. The remaining participants (N=28, 34.1%) noted that they were reprimanded by their supervisor, received few citations of their paper, experienced damage to their reputation, and missed the opportunity for helpful peer review. Two participants (2%) reported having attempted to retract the article by contacting the journal, but the articles were still published.

**Evaluating Future Journals Prior to Submission**

Nineteen participants (23.2%) reported that the experience of publishing in a presumed predatory journal has not changed how they evaluate journals prior to submitting other articles. The other participants (N=63, 76.8%) stated they would be more careful in future journal selection by checking: impact factor, a DOI or ISSN, journal indexing, background of editor, peer-review process, citations, Beall’s list, or with others (e.g., colleagues, university management, supervisors). Some participants shared that the experience has taught them to never pay for publication, to only publish in well-known journals, and to not publish in open-access journals.

**Table 3.** Summary results of qualitative survey responses

<table>
<thead>
<tr>
<th>Item</th>
<th>Themes (Subthemes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>What factors or criteria influenced your decision to submit your manuscript to this journal instead of another journal (e.g., publishing pressure; As part of current job requirements; For tenure or promotion; Seeking employment/to get hired; Part</td>
<td>Academic and Professional Factors</td>
</tr>
<tr>
<td>How did you first become aware that the journal you published in was potentially predatory in nature or may not be scientifically rigorous (e.g., I received no peer review although the editor said the article will be published within 24 hours)?</td>
<td>This Survey</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Disagree that Journal is Predatory</td>
<td></td>
</tr>
<tr>
<td>Concerns Raised by Others</td>
<td></td>
</tr>
<tr>
<td>Fees (Payment)</td>
<td></td>
</tr>
<tr>
<td>Publication Process (Peer review; Atypical correspondence; Continued promotion emails)</td>
<td></td>
</tr>
<tr>
<td>List of Predatory Journals</td>
<td></td>
</tr>
<tr>
<td>Lack of Indexing</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Were there other motivations for publishing in the journal that we have not asked about (e.g., salary increase)?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Factors (Personal Satisfaction)</td>
<td></td>
</tr>
<tr>
<td>Academic and Professional Factors (Publication pressure; Self-citation; Part of being a researcher; Salary increase; Promotion in developing countries; To increase program rankings)</td>
<td></td>
</tr>
<tr>
<td>Factors Related to the Paper Published (Topic fit with journal; Low quality of manuscript; Publishing unpublished work; Student paper)</td>
<td></td>
</tr>
<tr>
<td>Factors Related to the Journal (Compared to “traditional journals”)</td>
<td></td>
</tr>
<tr>
<td>Desire to Disseminate Research (Publishing before retirement; Dissemination of work is easy because of the internet)</td>
<td></td>
</tr>
<tr>
<td>Supporting New or Small Journals</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Did you see any career risks associated with publishing in this journal (e.g., getting caught by a colleague)?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes (Risks Not Specified)</td>
<td></td>
</tr>
<tr>
<td>Reprimanded by Supervisor</td>
<td></td>
</tr>
</tbody>
</table>
Few Citations
Damage to Reputation
Retraction (Published even after retraction; Requested retraction)
Continued Emails from Journal
Missed Opportunity for Peer Review

Has anyone else discussed the potentially predatory nature of this journal with you (e.g. the paper’s co-authors, your dean, supervisor, tenure & promotions committee)?

No
Yes (Individual Not Specified)
Yes (Colleagues and co-authors; Supervisors; University staff or committees)
Another Researcher Conducting Work on Predatory Journals

Has the experience of publishing in a potentially predatory journal affected how you evaluate future journals prior to submission? If yes, how?

No
Yes (Not Specified How)
Will Check Details about the Journal (Will be more careful; Check impact factor; Check if it has a DOI or ISSN; Check journal indexing; Check journal background/editor; Check peer review process; Check citations; Check Beall’s list; Check open source journals
Consult with Others (Colleagues; University management; Scientific committee; Supervisor)
Will Only Publish in Known/Prestigious/Authenticated Journals
Not Publish in Open Access Journals
Fees
Suggestions

Note: DOI = Digital object identifier; ISSN = International Standard Serial Number

Data Sharing Statement

Data screening and extraction forms, as well as random samples of journals, can be found on the OSF: https://osf.io/jy3vh/. Each survey question, theme, and participant responses can be found in the OSF (https://osf.io/xrstp/).
Discussion

This research is among the first to survey a geographically diverse group of biomedical researchers about their motivations and experiences of submitting to, and publishing in, presumed predatory journals. The most striking finding of our survey is that the vast majority of respondents reported receiving peer review feedback that they found to be substantive in nature. A strongly held belief is that predatory journals generally do not provide peer review and if they do it is frivolous and/or minimal and does not add to the scientific integrity of article; indeed this characteristic has been proposed as an important differentiator between presumed predatory journals and legitimate open access journals. Previous research confirms that articles published in predatory journals are of very low quality compared to research published in legitimate open access journals(7). To more fully understand the respondents’ peer reviews requires access to them. While more than a quarter of the respondents indicated their willingness to share their peer reviewers only two did so, and one was an article proof rather than a peer review.

Slightly less than half of the respondents indicated they did not pay an article processing fee to publish they article. This finding differs from previous assumptions about the business model of predatory journals and publishers and differs from most legitimate open access biomedical journals (https://bit.ly/2vrht1a). More than a half of the respondents identified as university professors or as researchers working in a research institute. Most of them indicated that their institutions do not have policies in place to deter them and others from submitting to predatory publishers and journals. The respondents also highlighted the pressure to publish as part of their promotion and tenure assessment. The qualitative analysis shed light on participants’ motivations and experiences of publishing in a predatory journal. It was clear that many participants did not agree the journal
in which they published was predatory. We perceived many participants felt strongly about this based on repetitive, emotionally-charged responses to the open-ended questions.

Our survey differs from previous efforts. For example, we focused on authors publishing biomedical articles whereas Kurt sought a broad spectrum of disciplines(10). Kurt’s results also differed from ours in that of his four thematic results: social identify threat, unawareness, high pressure, and lack of research proficiency, only high pressure to publish and unawareness were also identified by us and two of these two motivators have also been identified by others (18).

Among 480 researchers from India who were identified as having published in a presumed predatory journal, more than 70% of them reported having pressure to publish research articles to facilitate career promotions and job security. Only 10% of respondents reported being aware that their relevant article was published in a predatory journal, however, more than 70% of them were not willing to answer this question. In addition to professors feeling pressure to publish, many reported submitting to presumed predatory journals to help students publish. In several parts of the world it is common for students to complete manuscript-based PhDs and without publications it is not possible for them to graduate. In the online survey of researchers from India, an institutional requirement of between one and three publications as a criterion for their PhD defense was reported by 90% of the respondents. What is troubling here is that students may model their professor’s behavior and actively engage in submitting to predatory journals as a goal from the inception of their career. Understanding the motivations that lead authors to submit to a predatory journal, whether intentionally or unintentionally, is important from the perspective of both academic institutions and research funders. We encourage stakeholders to examine the guidelines used at our research institute to raise awareness and help deter prospective authors from submitting to
predatory journals. The policy is freely available using a creative commons license for easy reuse and modification (see: https://osf.io/tvz4a/).

Our response rate was lower than that reported by others surveying this community(9,10). It is possible that our initial survey was not conducted with an optimal temporal relationship to the identified published article; there was a time lag between publication and sending out the survey. We tried to counter this with our second survey although only achieved a modest increase in the response rate. It is possible that biomedical researchers are more reluctant to discuss presumed predatory journals compared to other disciplines. This likely requires additional inquiry. We found it difficult interpreting some free text survey responses perhaps signaling that English was not the first language of some respondents. It is possible that our results are influenced by cognitive bias given the nature of our questions and the content we are inquiring about, namely, presumed predatory journals; it is unclear whether all of the journals included in our analyses were predatory. It is difficult to adjust survey responses for such bias. Future surveys as to the motivations for publishing in these journals should develop questions that minimize or avoid cognitive bias. We focused on biomedical researchers as this is the discipline most relevant to the co-author team, and because of the implications that publishing biomedical research can have on patients and clinical care. There is accumulating evidence that articles published in predatory journals are leaking into trusted sources of information, such as PubMed(19). It is unclear whether such articles end up in systematic reviews or clinical practice guidelines which impact clinical practice and health policies. This also requires additional investigation. Finally, our survey results need to be interpreted in light of them being based on self-reported responses.

While these results are informative, and provocative in places, adding to the knowledge base of presumed predatory publishers and journals, they do not provide a complete picture regarding the
motivations to publish in presumed predatory journals. Knowledge of researcher motivations to publish in predatory journals is critical in order to be able to develop effective interventions to prevent future submissions. For example, if researchers are intentionally using these outlets as a means to pad their CVs, outreach and education is unlikely to effectively stop future submissions. However, educational outreach to hiring, promotion and tenure committees might be useful. In contrast, if researchers are being duped, or because of their lack of knowledge on issues with predatory journals, outreach and training may be an appropriate intervention. The outcomes from this work may have important implications for policy development and on actions to thwart presumed predatory journals.

Addressing these, and other related questions, require resources. To date funders have not indicated their interest in funding investigations into predatory journals. This is unfortunate and perhaps short sighted. Data indicates a steep upward trajectory in the number of research articles published in predatory journals (even though this represents a very small fraction of the total number of biomedical publications). Some research ending up in predatory journals is funded. This is likely a bad investment in what for most funders is a limited fiscal budget. We recommend that funders give more serious consideration to funding research in predatory journals and act to promptly develop relevant policy. Other players also need to be involved in helping to weed out predatory publishers and journals(6).

Acknowledgements

We are grateful to Raymond Daniel who helped upload journal names and URL’s into DistillerSR for review and reference formatting.
Author Contributions

KDC, DM, MML conceived of the study idea. KDC, DM, AG, MML wrote the study protocol and designed the study survey. KDC, HR, DBR, AG identified the sample and extracted information related to corresponding authors. HR and KDC sent the e-mail to the sample of participants. KDC, AG, DBR conducted the study analysis. KDC, AG, DBR wrote the initial draft of the article. All authors provided critical feedback and agreed to the final version of the paper. DM provided funding for participant reimbursement costs.

Data sharing statement

Our protocol, survey, ethics approval, data and analytical code are all available at the Open Science Framework https://osf.io/27bkm.

References


Knowledge and motivations of researchers publishing in presumed predatory journals: a survey

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Knowledge and Motivations of Researchers Publishing in Presumed Predatory Journals: A Survey

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Abstract

Objectives: To develop effective interventions to prevent publishing in presumed predatory journals (i.e., journals that display deceptive characteristics, markers, or data that cannot be verified), it is helpful to understand the motivations and experiences of those who have published in these journals.

Design: An online survey delivered to two sets of corresponding authors containing demographic information, and questions about researchers' perceptions of publishing in the presumed predatory journal, type of article processing fees paid, and the quality of peer review received. The survey also asked six open-ended items about researchers' motivations and experiences.

Participants: Using Beall's lists, we identified two groups of individuals who have published empirical articles in biomedical journals that were presumed to be predatory.

Results: Eighty-two authors partially responded (~14% response rate (11.4% (44/386) from the initial sample, 19.3% (38/197) from second sample) to our survey. The top three countries represented were India (N=21, 25.9%), USA (N=17, 21.0%), and Ethiopia (N=5, 6.2%). Three participants (3.9%) thought the journal they published in was predatory at the time of article submission. The majority of participants first encountered the journal via an e-mail invitation to submit an article (N=32, 41.0%), or through searching online to find a journal with relevant scope (N=22, 28.2%). Most participants indicated their study received peer review (N=65, 83.3%), and that this was helpful and substantive (N=51, 79.7%). More than a third (N=32, 45.1%) indicated they did not pay fees to publish.

Conclusions: This work provides some evidence to inform policy to prevent future research from being published in predatory journals. Our research suggests that common views about predatory journals (e.g., no peer review) may not always be true, and that a grey zone between legitimate
and presumed predatory journals exists. These results are based on self-reports and may be biased thus limiting their interpretation.

**Strengths and Limitations of this Study**

- Survey specifically explored researcher motivations to publish in predatory journals
- Survey targeted biomedical researchers, where dissemination of preclinical and clinical outcomes may affect health services and patient care
- Survey is limited by a low response rate from participants

**Funding Statement**

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**Competing Interest Statement**

The authors do not have any competing interests.
Introduction

In the current scholarly landscape, the threat of presumed predatory journals (i.e., journals that display deceptive characteristics, markers, or data that cannot be verified because there is no gold standard as to what defines predatory journals) adds a further layer of complexity to the journal selection process. The presumption of predation is on the part of us because the journals we examined have signs, such as fake journal impact factors, suggesting they fail to meet expected best journal standards. There is a sense that predatory journals exploit the open access (OA) publishing model (in which authors typically pay a fee to publish to ensure that their work is publicly and freely accessible), often by “spamming” researchers(1,2) with offers of rapid publication at a much lower cost than legitimate OA journals, or without acknowledging upfront that accepted manuscripts are subject to publication fees(3,4). Subsequently, it is suspected that these journals conduct frivolous (or no) peer review and often accept and publish manuscripts without any editing or editorial oversight whatsoever(5).

Without action by relevant stakeholders, the potential for predatory journals to continue to penetrate the scholarly community is great(6,7). Understanding what predatory journals are(8) and what motivates researchers to submit to and publish in these journals is essential to preventing future submissions. Failure to address predatory journals means that they will continue to contribute to waste and inefficiency in dissemination. Public broadcasters in Germany undertook a review of researchers to determine the presence of German scientists publishing in predatory journals (https://www.the-scientist.com/news-opinion/german-scientists-frequently-publish-in-predatory-journals-64518). More than 5000 German scientists were reported as having published papers in predatory journals where the peer review process did not occur. Many of the projects were also receiving public funding. Further, a recent study examined more than 45,000 Italian CVs
and found that approximately 5% contained research thought to be published in predatory journals (9). A related survey of those researchers who published in predatory journals (response rate 54%) found that about 33% had colleagues suggest a predatory journal as an option for submission, 27% of researchers submitted their work to a predatory journal in response to an e-mail invitation, while 12% said their decision for where to submit their manuscript was linked to a conference presentation. A survey by Kurt (10) obtained responses from 96 authors who had published in 50 randomly selected journals on Beall’s journal list. Respondents were from a range of scientific fields, and the survey was predominantly composed of open-ended questions analysed qualitatively. Kurt reported that the reason these individuals published in predatory journals were captured in four themes: social identify threat, unawareness, high pressure, and lack of research proficiency. These findings provide initial evidence for how researchers come to submit their papers to predatory journals, but they do not explicitly consider a broad range of motivations. In addition, it is likely that there are nuances between scientific disciplines, which may have different norms and expectations pertaining to publishing scholarly activity.

Here, we seek to examine the motivations and experiences of biomedical researchers who have submitted to predatory journals. To address the prevalence of these and other motivations, we conducted a multi-national survey of researchers who published in predatory biomedical journals.

Methods

This study received ethical approval from the Ottawa Health Science Network Research Ethics Board (20170956-01H; see: https://osf.io/xaze9/). We conducted an online survey to obtain
information about the motivations and experiences of researchers who have published in potentially predatory biomedical journals.

Identifying participants

Initially, we identified a sample of participants to send our survey to using an existing dataset of 1907 articles(7) that had been published in predatory biomedical journals. This sample was derived in a previous study examining a random selection of articles published in journals listed on Beall’s Lists of ‘potential, possible, or probable’ predatory journals(11). The dataset included the e-mail contact details for the corresponding authors of each paper when available. From the total group of 1907 articles, we selected those, and related author details, that were coded as having the following research designs: randomized controlled trial (N=94), observational cohort (N=180), or a pre-clinical research-based article (N=201). These study designs were selected to provide a combination of clinical and pre-clinical research, and in an effort to achieve a response rate of approximately 200 participants. We had anticipated a response rate of ~40% given rates of response from previous work(9,10). This sampling procedure is consistent with the methods described in the original study protocol that was posted prior to data collection on the Open Science Framework (OSF): https://osf.io/wgm7f/. A low response rate (see results) ensued. We considered that one reason for the modest response rate to the initial survey was that the authors sampled for our survey had been gathered in a study published in 2015. It was thought that obtaining a more recent sample of authors may result in a greater response rate. Therefore, after seeking a revision in ethical approval, we identified a second sample of potential authors of predatory journals to which to send our survey.
To identify this second sample, we used two approaches. Firstly, we used Beall’s lists to identify 100 additional journals. Although Beall removed his lists of predatory journals and publishers from his blog website in early 2017(12), his lists have been curated and updated anonymously at this website: https://beallslist.weebly.com/. We extracted all journals on Beall’s list of single journal publishers on March 5th, 2018. Journal names and their corresponding URL (N=1310) were extracted and then their websites were screened in duplicate (KDC, HR, AG, DBR) to determine if they were active websites, if they published in English, and published research that was predominantly biomedical. We used the Medline definition to define biomedical journals as journals “predominantly devoted to reporting original investigations in the biomedical and health sciences, including research in the basic sciences; clinical trials of therapeutic agents; effectiveness of diagnostic or therapeutic techniques; or studies relating to the behavioural, epidemiological, or educational aspects of medicine”.(13) From the journals that met these inclusion criteria (N=158), we then took a random sample, using the [RAND] function in Excel, of 100 journals. Secondly, we obtained a random sample of 100 biomedical journals published by OMICS (a large publisher of predatory journals (14,15)). To do so, we selected all journals classified by OMICS as being “Clinical and Medical Sciences” journals. We de-duplicated journals that were listed more than once, which resulted in 500 unique journals, and using the [RAND] function in Excel, we randomly selected 100 journals.

From the combined random sample of the 200 journals obtained from the single journal publishers on Beall’s list (N=100) and from OMICS journals (N=100), reviewers in teams of two (DR, HR, AG, KDC) extracted the most recently posted research article (i.e., empirical article; we excluded commentaries, non-systematic reviews, editorials, etc.) from each of these journals. They
subsequently extracted information including: the year of publication, the corresponding author’s name and e-mail address (if identifiable), the corresponding author’s country of origin (first listed in affiliation), the article title, and a classification of research type (clinical, preclinical, other). If there were no research articles available, the extracted research article did not provide accurate contact details of the corresponding author, or journal website did not function, we replaced the journal with another randomly selected journal (N=30 journals replaced from 100 Beall’s list journals; N=14 journals replaced from OMICS list journals).

Survey administration

Online survey links were sent to both samples of participants from the primary investigator (KDC) using a standardized recruitment script (available on the OSF: https://osf.io/27bkm/) via a personalized email which specified the participants name, and the title of the identified article. We used MailMerge software to expedite this process. Participants were given two weeks to complete the survey. Participants received a standard follow-up e-mail reminder one week after the receiving their original invitation to participate.

Survey

The survey used (see: https://osf.io/27bkm/) was purpose built, administered in English, and distributed using SurveyMonkey(16). The survey began with participants completing online consent, and then several items intended to capture respondent demographics (e.g., age, gender, country of residency, education level, and research specialty area). Subsequently, the survey asked about respondents’ research status and publication record. Then, the survey asked respondents
about any relevant institutional publication policies, and about whether respondents felt pressured by their institution to publish. Several items then addressed the respondents’ experience submitting and publishing the article we captured in our sample of predatory publications. Six open-ended questions then addressed the respondents’ decision to publish in the particular journal, when they learned of its potentially predatory nature, and the career implications of the publication. No personal health information or personally identifying information was collected.

When participants completed the survey, they were provided with a generic research code, which they were instructed to send back to the project team via another SurveyMonkey link in which they also reported their e-mail address. The project team subsequently reimbursed participants for their time in the form of a $20CAD online Amazon gift card voucher. Following this method allowed us to successfully reimburse participants without them having to provide personal identifying information as part of their survey responses.

Data analysis

We report descriptive statistics for characteristics of the participants and summary statistics for quantitative items pertaining to researcher’s experiences, knowledge, and motivations. Data are reported using means or percentages as relevant. Given the relatively modest sample, in a deviation from our protocol, we do not provide comparative data illustrating findings by researcher rank, gender, discipline, or geographic location. For open-ended survey items, we used conventional content analysis(17). Without using preconceived categories, two researchers (AG, DBR) independently identified key themes in the data then discussed the themes generated until consensus was achieved for themes and subthemes. Key themes are summarized and presented
using a narrative synthesis with illustrative quotes and using count data where relevant. Data was exported from the survey software into SPSS where means and percentages were calculated. Qualitative data was analyzed in Microsoft Word.

**Patient and Public Involvement**

The focus of this research was the motivations of authors to publish in predatory journals. As such we did not involve patients or the public in the development of the research question or outcomes.

**Results**

We sent our survey to a total of 583 potential participants. This number is lower than the combined number of articles identified from the original study database (randomized controlled trial (N=94), observational cohort (N=180), or a pre-clinical research-based article (N=201)) and the 200 additional sampled articles. This is because not all articles in the original study database contained corresponding e-mail addresses of authors, and in both samples several of the e-mails sent received bounce-back messages.

A total of 82 participants responded to our survey (44 from initial sample, 38 from second sample), although some participants did not complete all items, or chose to skip particular questions. This represents an overall response rate of approximately 14% (11.4% (44/386) from the initial sample, 19.3% (38/197) from second sample). Demographic characteristics of participants are described in Table 1. We first examined the quantitative survey item results (Table 2), then we examined qualitative survey results (Table 3).
Research institutions

Five percent (N=4) of survey respondents indicated that their institution has a policy against publishing in predatory journals at the time they published their article. Forty-one percent (N=32) of respondents indicated they felt pressured to publish by their institution, and 25.3% (N=20) indicated their institution required them to publish a specific number of articles to be considered for tenure and promotion.

Participants’ perceptions and experience publishing

When participants were asked about the article sampled, 46.3% (N=38) indicated they did not think the journal they published in was predatory at the time of submission but that they do believe so now, 43.9% (N=36) felt the journal they published in was not predatory at the time of submission and maintain this view, while just 3.9% (N=3) indicated they were aware the journal was predatory at the time of submission. Participants indicated that they became aware of the journal they published in predominantly through direct e-mail invitations to submit from the journal (N=32, 41.0%), or through online searching for a relevant journal to which to submit (N=22, 28.2%). Participants indicated that they submitted their article via an online portal on the journal website (N=55, 70.5%) or via a direct e-mail to the journal (N=21, 26.9%). A small percent (N=2, 2.6%) could not remember how they submitted their article. Slightly more than a third (N=28, 35.4%) of participants indicated that they had submitted their article to another journal previously. Articles that had been submitted previously had been rejected by a mean of 2.04 (0.99
SD) journals. A little more than a quarter (N=21, 27.6%) of participants said they would publish in the journal in question again, while 36.6% (N=30) would not, and 30.5% (N=25) were uncertain.

**Article processing charges**

Seventy-one of the 82 participants (86.9%) responded to the question asking about the fee paid to publish their work. Participants responded in the currency they paid, and these rates were converted using Google to US dollars. This was done on June 7, 2018, and rates were rounded to the nearest dollar. As currency rates fluctuate, these values should only be considered as estimates.

Of the 71 respondents, 45.1% (N=32) indicated they did not have to pay an article processing charge to publish their article. Those respondents who did pay a fee (N=39, 54.9%) paid between $30-4000 US dollars (Mean: $347.63; Median: $74; Sum: $24,682).

**Peer review**

The majority (N=65, 83.3%) of participants indicated that their paper underwent peer review, while 16.7% (N=12) indicated it did not. Among those participants who indicated their paper was peer reviewed, 79.7% (N= 51) indicated they felt the peer review was substantial and helpful, while 20.3% (N=13) indicated it was not. Twenty of the 64 participants (31.3%) who indicated that their article underwent peer review indicated that they would be willing to share the reviews with our research team. Just 2 eventually forwarded reviews (one of which was a paper proof not a review), and one author copied the review into the survey.
Table 1. Participant characteristics

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<th>Sample</th>
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<td>Age range (Mean±SD)</td>
<td>27-77 (45.46±13.14)</td>
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<td>Sex, N (%)</td>
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</tr>
<tr>
<td>Male: 59 (72.8)</td>
<td></td>
<td>81</td>
</tr>
<tr>
<td>Female: 21 (25.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: 1 (1.2)</td>
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<td>Top 3 Nationalities, N(%)</td>
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</tr>
<tr>
<td>India: 21 (25.9)</td>
<td></td>
<td>81</td>
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<tr>
<td>USA: 17 (21.0)</td>
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<td>Ethiopia: 5 (6.2)</td>
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<td>Research discipline, N (%)</td>
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<td>Pre-clinical/basic research: 27 (32.9)</td>
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<td>Other: 6 (7.3)</td>
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<td>Researcher at research institute: 13 (16.3)</td>
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</tr>
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<td>Researcher in private sector: 3 (3.8)</td>
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<td></td>
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<tr>
<td>Other: 10 (12.5)</td>
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<td>Number of papers published within a year of the presumed predatory publication, N (%)</td>
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<td>1-3: 39 (50.6)</td>
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<tr>
<td>4-6: 20 (26.0)</td>
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<td>7+: 15 (19.5)</td>
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Table 2. Summary results of quantitative survey items

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<td>Did the primary institution you were based at the year you published that prohibited predatory journals? (N, %)</td>
<td>Yes: 4 (5.0)</td>
<td>80</td>
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<tr>
<td></td>
<td>No: 53 (66.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Don’t know: 23 (28.7)</td>
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<td>Did the primary institution you were based at the year you published your paper make you feel pressured to publish (e.g., as part of a degree requirement or for promotion and/or tenure)? (N, %)</td>
<td>Yes: 32 (41.0)</td>
<td>78</td>
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<tr>
<td></td>
<td>No: 46 (59.0)</td>
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<tr>
<td>Did the primary institution you were based the year you published your paper have a policy on whether faculty need a specific number of publications to be considered for promotion or tenure? (N, %)</td>
<td>Yes: 20 (25.3)</td>
<td>79</td>
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<tr>
<td></td>
<td>No: 40 (46.5)</td>
<td></td>
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<td></td>
<td>Unsure: 9 (11.4)</td>
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<tr>
<td></td>
<td>Not applicable (e.g. I was a student): 10 (12.7)</td>
<td></td>
</tr>
<tr>
<td><strong>Participants’ perceptions and experience publishing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We believe the journal in which you published may be a predatory journal. When submitting, were you:</td>
<td>Aware that it was predatory: 3 (3.9)</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>Not aware that it was predatory, but now do consider it predatory: 38 (46.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not aware that it was predatory and continue to think it is not predatory: 36 (43.9)</td>
<td></td>
</tr>
<tr>
<td>How did you first become aware of this presumed predatory journal prior to submission?</td>
<td>E-mail invitation: 32 (41.0)</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>A colleague: 10 (12.8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supervisor/mentor: 5 (6.4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reading the journal: 4 (5.1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Online searching for journal: 22 (28.2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other: 5 (6.4)</td>
<td></td>
</tr>
<tr>
<td>Had the paper you published in this presumed predatory journal been submitted elsewhere previously?</td>
<td>Yes: 28 (35.4)</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>No: 48 (60.8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unsure: 3 (3.8)</td>
<td></td>
</tr>
<tr>
<td>How many times had the paper been submitted previously?</td>
<td>1: 8 (28.6)</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>2: 12 (42.9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3: 4 (14.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4+: 2 (7.1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Don’t remember: 2 (7.1)</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Option</td>
<td>Count</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>---------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>How was the paper submitted to the journal?</td>
<td>Online submission portal: 55 (70.5)</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>Via e-mail: 21 (26.9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other: 2 (2.6)</td>
<td></td>
</tr>
<tr>
<td>What factors or criteria influenced your decision to submit your manuscript to this journal instead of another journal (select all that apply)?</td>
<td>I felt it was the appropriate journal for my publication based on my normal process for selecting a journal (e.g., quality of journal, fit of topic/audience, etc.): 53 (67.1)</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>Adding to my CV quickly for hiring, promotion or tenure: 6 (7.6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adding to my CV quickly for a grant application: 0 (0.0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I needed to publish a paper quickly as part of my coursework/program: 17 (21.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General pressure to publish: 13 (16.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unable to publish the paper in other journals: 13 (16.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other: 4 (5.1)</td>
<td></td>
</tr>
<tr>
<td>Peer Review</td>
<td>Did the paper receive peer review?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes: 65 (83.3)</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>No: 12 (16.7)</td>
<td></td>
</tr>
<tr>
<td>Was the peer review substantial and helpful?</td>
<td>Yes: 51 (79.7)</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>No: 13 (20.3)</td>
<td></td>
</tr>
<tr>
<td>Article processing charges</td>
<td>Where did you obtain money to pay the fee to publish?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Research grant funding: 7 (9.6)</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>University/employer research funding: 10 (13.7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Personal money: 29 (39.7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other: 3 (4.1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No fee paid: 24 (32.9)</td>
<td></td>
</tr>
<tr>
<td>Would you publish in this journal again in the future?</td>
<td>Yes: 21 (27.6)</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>No: 30 (36.6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uncertain: 25 (30.5)</td>
<td></td>
</tr>
</tbody>
</table>
Qualitative Survey Results

Open-ended survey responses were categorized by survey question through content analysis. Themes and subthemes are presented by survey question in Table 3. Below, we provide a narrative synthesis of the data, including motivations and reasons for selecting the journal (survey questions 11 & 13), learning about the journal’s predatory nature (questions 12 &15), career risks (questions 14), and evaluating journals for future submissions (question 16).

Motivations and Reasons for Selecting the Journal

When asked about factors that influenced their decision to submit to the selected journal, participants noted academic and professional factors (e.g., publishing pressure, for tenure); factors related to the journal (e.g., fit of paper with journal, perception of quality); factors related to the paper published (e.g., difficulty publishing elsewhere due to low originality of the research, previous rejections); desire to disseminate research; invitation from the journal; recommendation from a colleague; or personal factors (e.g., lack of mentorship, lack of knowledge, personal motivations to publish). In addition to general publishing pressure, seven respondents (8.5%) noted that they had to publish as part of degree requirements or did so to support the CV of a student. Fifteen participants (18.3%) also reported that they perceived the journal to be of quality for reasons such as: “reputation of the editor,” “the journal name seems familiar,” “well formatted manuscript submission platform,” “Journal based in United States, or “papers already published in this journal by U.S. and German scientists”. Others valued the ease and speed of publication and the journal’s low fees, as captured by one response: “Frustration with number of hours required to publish in standard journals after factoring in rejection.” One participant (1.2%) noted the importance of supporting new and small journals.
When asked about other motivations for publishing in the selected journal, several participants expressed frustration with “traditional” journals, noting very long ‘time to publication’ periods, high fees, unnecessarily critical peer review, and a bias toward publishing only the work of well-known researchers. One respondent captured the sentiment:

“Open access is great. Other journals have too much unjustified criticism in their peer review process. Quite often even excellent articles are rejected while mediocre or trivial papers of well-known scientists or people of their lab are published. Many people think that quality journals operate [with] nepotism.”

Learning about the Journal’s Predatory Nature

Twenty-four participants (28.3%) reported that our survey was the first time they learned the journal was potentially predatory. Thirteen participants (15.9%) disagreed that the journal was predatory and provided reasons such as: “I received peer review first,” “It took over 3 months before my manuscript was published,” and, “[The journal] is accepted by the university.” Those that did agree the journal was predatory, and learned about its nature prior to the survey, said they learned it was predatory because of hidden fees or unusual payment processes, publication processes (e.g., incoherent or non-critical peer review, atypical correspondence), a list of predatory journals, or a lack of journal indexing.

Participants were also asked if anyone discussed the predatory nature of the journal with them. Sixty-one participants (74.4%) said no. The remaining participants (N=21, 25.6%) were approached by colleagues and co-authors, supervisors, or university staff. One participant (1.2%)
responded they were approached “… only [by] close colleagues, who thought I had finished my research career.”, perhaps implying their perspectives of the risks of publishing in presumed predatory journals.

**Career Risks**

Most participants (N=54, 65.9%) reported not experiencing any career risks related to publishing in a potentially predatory journal. The remaining participants (N=28, 34.1%) noted that they were reprimanded by their supervisor, received few citations of their paper, experienced damage to their reputation, and missed the opportunity for helpful peer review. Two participants (2%) reported having attempted to retract the article by contacting the journal, but the articles were still published.

**Evaluating Future Journals Prior to Submission**

Nineteen participants (23.2%) reported that the experience of publishing in a presumed predatory journal has not changed how they evaluate journals prior to submitting other articles. The other participants (N=63, 76.8%) stated they would be more careful in future journal selection by checking: impact factor, a DOI or ISSN, journal indexing, background of editor, peer-review process, citations, Beall’s list, or with others (e.g., colleagues, university management, supervisors). Some participants shared that the experience has taught them to never pay for publication, to only publish in well-known journals, and to not publish in open-access journals.

**Table 3. Summary results of qualitative survey responses**

<table>
<thead>
<tr>
<th>Item</th>
<th>Themes (Subthemes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>What factors or criteria influenced your decision to submit your manuscript to this journal instead of another journal (e.g., Academic and Professional Factors (General; General publishing pressure; As part of current job requirements; For tenure or promotion; Seeking employment/to get hired; Part</td>
<td></td>
</tr>
<tr>
<td>How did you first become aware that the journal you published in was potentially predatory in nature or may not be scientifically rigorous (e.g., I received no peer review although the editor said the article will be published within 24 hours)?</td>
<td>This Survey</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Concerns Raised by Others</td>
<td></td>
</tr>
<tr>
<td>Fees (Payment)</td>
<td></td>
</tr>
<tr>
<td>Publication Process (Peer review; Atypical correspondence; Continued promotion emails)</td>
<td></td>
</tr>
<tr>
<td>List of Predatory Journals</td>
<td></td>
</tr>
<tr>
<td>Lack of Indexing</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Were there other motivations for publishing in the journal that we have not asked about (e.g., salary increase)?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Factors (Personal Satisfaction)</td>
<td></td>
</tr>
<tr>
<td>Academic and Professional Factors (Publication pressure; Self-citation; Part of being a researcher; Salary increase; Promotion in developing countries; To increase program rankings)</td>
<td></td>
</tr>
<tr>
<td>Factors Related to the Paper Published (Topic fit with journal; Low quality of manuscript; Publishing unpublished work; Student paper)</td>
<td></td>
</tr>
<tr>
<td>Factors Related to the Journal (Compared to “traditional journals”)</td>
<td></td>
</tr>
<tr>
<td>Desire to Disseminate Research (Publishing before retirement; Dissemination of work is easy because of the internet)</td>
<td></td>
</tr>
<tr>
<td>Supporting New or Small Journals</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Did you see any career risks associated with publishing in this journal (e.g., getting caught by a colleague)?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes (Risks Not Specified)</td>
<td></td>
</tr>
<tr>
<td>Reprimanded by Supervisor</td>
<td></td>
</tr>
</tbody>
</table>
Few Citations
Damage to Reputation
Retraction (Published even after retraction; Requested retraction)
Continued Emails from Journal
Missed Opportunity for Peer Review

Has anyone else discussed the potentially predatory nature of this journal with you (e.g. the paper’s co-authors, your dean, supervisor, tenure& promotions committee)?

<table>
<thead>
<tr>
<th>Has anyone else discussed the potentially predatory nature of this journal with you (e.g. the paper’s co-authors, your dean, supervisor, tenure&amp; promotions committee)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
<tr>
<td>Yes (Individual Not Specified)</td>
</tr>
<tr>
<td>Yes (Colleagues and co-authors; Supervisors; University staff or committees)</td>
</tr>
<tr>
<td>Another Researcher Conducting Work on Predatory Journals</td>
</tr>
</tbody>
</table>

Has the experience of publishing in a potentially predatory journal affected how you evaluate future journals prior to submission? If yes, how?

<table>
<thead>
<tr>
<th>Has the experience of publishing in a potentially predatory journal affected how you evaluate future journals prior to submission? If yes, how?</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
<tr>
<td>Yes (Not Specified How)</td>
</tr>
<tr>
<td>Will Check Details about the Journal (Will be more careful; Check impact factor: Check if it has a DOI or ISSN; Check journal indexing; Check journal background/editor; Check peer review process; Check citations; Check Beall’s list; Check open source journals)</td>
</tr>
<tr>
<td>Consult with Others (Colleagues; University management; Scientific committee; Supervisor)</td>
</tr>
<tr>
<td>Will Only Publish in Known/Prestigious/Authentic Journals</td>
</tr>
<tr>
<td>Not Publish in Open Access Journals</td>
</tr>
<tr>
<td>Fees</td>
</tr>
<tr>
<td>Suggestions</td>
</tr>
</tbody>
</table>

Note: DOI = Digital object identifier; ISSN = International Standard Serial Number

Data Sharing Statement

Data screening and extraction forms, as well as random samples of journals, can be found on the OSF: https://osf.io/jy3vh/. Each survey question, theme, and participant responses can be found in the OSF (https://osf.io/xrstp/).
Discussion

This research is among the first to survey a geographically diverse group of biomedical researchers about their motivations and experiences of submitting to, and publishing in, presumed predatory journals. The most striking finding of our survey is that the vast majority of respondents reported receiving peer review feedback that they found to be substantive in nature. A strongly held belief is that predatory journals generally do not provide peer review and if they do it is frivolous and/or minimal and does not add to the scientific integrity of article; indeed this characteristic has been proposed as an important differentiator between presumed predatory journals and legitimate open access journals. Previous research confirms that articles published in predatory journals are of very low quality compared to research published in legitimate open access journals(7). To more fully understand the respondents’ peer reviews requires access to them. While more than a quarter of the respondents indicated their willingness to share their peer reviewers only two did so, and one was an article proof rather than a peer review.

More than a third of the respondents indicated they did not pay an article processing fee to publish their article. Previous research found similar results in a comparison of presumed predatory journals and legitimate open access journals(18). More than a half of the respondents identified as university professors or as researchers working in a research institute. Most of them indicated that their institutions do not have policies in place to deter them and others from submitting to predatory publishers and journals. The respondents also highlighted the pressure to publish as part of their promotion and tenure assessment. The qualitative analysis shed light on participants’ motivations and experiences of publishing in a predatory journal. It was clear that many participants did not agree the journal in which they published was predatory. We perceived many participants felt
strongly about this based on repetitive, emotionally-charged responses to the open-ended questions.

Our survey differs from previous efforts. For example, we focused on authors publishing biomedical articles whereas Kurt sought a broad spectrum of disciplines(10). Kurt’s results also differed from ours in that of his four thematic results: social identify threat, unawareness, high pressure, and lack of research proficiency, only high pressure to publish and unawareness were also identified by us and two of these two motivators have also been identified by others (19). Among 480 researchers from India who were identified as having published in a presumed predatory journal, more than 70% of them reported having pressure to publish research articles to facilitate career promotions and job security. Only 10% of respondents reported being aware that their relevant article was published in a predatory journal, however, more than 70% of them were not willing to answer this question. In addition to professors feeling pressure to publish, many reported submitting to presumed predatory journals to help students publish. In several parts of the world it is common for students to complete manuscript-based PhDs and without publications it is not possible for them to graduate. In the online survey of researchers from India, an institutional requirement of between one and three publications as a criterion for their PhD defense was reported by 90% of the respondents. What is troubling here is that students may model their professor’s behavior and actively engage in submitting to predatory journals as a goal from the inception of their career. Understanding the motivations that lead authors to submit to a predatory journal, whether intentionally or unintentionally, is important from the perspective of both academic institutions and research funders. We encourage stakeholders to examine the guidelines used at our research institute to raise awareness and help deter prospective authors from submitting to
predatory journals. The policy is freely available using a creative commons license for easy reuse and modification (see: https://osf.io/tvz4a/).

Our response rate was lower than that reported by others surveying this community(9,10). It is possible that our initial survey was not conducted with an optimal temporal relationship to the identified published article; there was a time lag between publication and sending out the survey. We tried to counter this with our second survey although only achieved a modest increase in the response rate. It is possible that biomedical researchers are more reluctant to discuss presumed predatory journals compared to other disciplines. This likely requires additional inquiry. We found it difficult interpreting some free text survey responses perhaps signaling that English was not the first language of some respondents. It is possible that our results are influenced by cognitive bias given the nature of our questions and the content we are inquiring about, namely, presumed predatory journals; it is unclear whether all of the journals included in our analyses were predatory and this is another limitation of our survey. Our survey is also based on self-reported data; this is a limitation. Further, some of these journals may not be predatory. There is no consensus on which characteristics or set of characteristics constitute predatory. Empirical data, such as the presentation of false metrics between journals listed on DOAJ compared to those not listed there is likely important in distinguishing between deceptive and legitimate journals. It is difficult to adjust survey responses for such bias. Future surveys as to the motivations for publishing in these journals should develop questions that minimize or avoid cognitive bias.

We focused on biomedical researchers as this is the discipline most relevant to the co-author team, and because of the implications that publishing biomedical research can have on patients and clinical care. There is accumulating evidence that articles published in predatory journals are leaking into trusted sources of information, such as PubMed(20). It is unclear whether such articles
end up in systematic reviews or clinical practice guidelines which impact clinical practice and health policies. This also requires additional investigation. Finally, our survey results need to be interpreted in light of them being based on self-reported responses.

While these results are informative, and provocative in places, adding to the knowledge base of presumed predatory publishers and journals, they do not provide a complete picture regarding the motivations to publish in presumed predatory journals. Knowledge of researcher motivations to publish in predatory journals is critical in order to be able to develop effective interventions to prevent future submissions. For example, if researchers are intentionally using these outlets as a means to pad their CVs, outreach and education is unlikely to effectively stop future submissions. However, educational outreach to hiring, promotion and tenure committees might be useful. In contrast, if researchers are being duped, or because of their lack of knowledge on issues with predatory journals, outreach and training may be an appropriate intervention. The outcomes from this work may have important implications for policy development and on actions to thwart presumed predatory journals.

Addressing these, and other related questions, require resources. To date funders have not indicated their interest in funding investigations into predatory journals. This is unfortunate and perhaps short sighted. Data indicates a steep upward trajectory in the number of research articles published in predatory journals (even though this represents a very small fraction of the total number of biomedical publications). Some research ending up in predatory journals is funded. This is likely a bad investment in what for most funders is a limited fiscal budget. We recommend that funders give more serious consideration to funding research in predatory journals and act to promptly develop relevant policy. Other players also need to be involved in helping to weed out predatory publishers and journals(6).
Acknowledgements

We are grateful to Raymond Daniel who helped upload journal names and URL’s into DistillerSR for review and reference formatting.

Author Contributions

KDC, DM, MML conceived of the study idea. KDC, DM, AG, MML wrote the study protocol and designed the study survey. KDC, HR, DBR, AG identified the sample and extracted information related to corresponding authors. HR and KDC sent the e-mail to the sample of participants. KDC, AG, DBR conducted the study analysis. KDC, AG, DBR wrote the initial draft of the article. All authors provided critical feedback and agreed to the final version of the paper. DM provided funding for participant reimbursement costs.

Data sharing statement

Our protocol, survey, ethics approval, data and analytical code are all available at the Open Science Framework https://osf.io/27bkm.

References


