ORIGINAL ARTICLE

Avoiding predatory journals and publishers: a cross-sectional study

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Abstract

Background: Predatory journals (PJs) are journals that receive and publish articles through unethical publishing practices. Due to the boom of PJs, researchers face a wide range of journals from which to choose. Non-peer reviewed and low-quality articles can ruin the trustworthiness of science and have a damaging impact on decision-makers.

Objective: To assess the level of awareness among Ethiopian researchers of PJs and to improve the awareness level through training.

Method: The participants were professors, associate professors, assistant professors, and lecturers from different disciplines. The study included 18 statements for participants to indicate their level of awareness on the Likert scale, questions on knowledge resources on PJs, and open-ended questions about ways of avoiding PJs. A one-day programme trained the participants in detecting and avoiding PJs.

Results: 43 participants completed the pre-assessment online survey and 37 participants completed the post-assessment survey. Many researchers were unaware of PJs and found it somewhat difficult to differentiate PJs from legitimate journals. However, during the post-assessment, the awareness level improved and the participants' rating of the task of differentiating PJs from legitimate journals changed from 'Somewhat difficult' to 'Easy'.

Conclusion: Many researchers were unaware of the potential distinctions between PJs and legitimate journals that are crucial to an appropriate journal for publishing. Especially low awareness was found on the journal impact factor, journal indexing services, and reputable publishers. Hence, before manuscript submission, authors ought to know and practise evaluating journals on the basis of the recommended criteria.

Keywords: Academic publishing, legitimate journal, predatory journal, research visibility

Introduction

Publishing in peer-reviewed scientific journals is the basis of evaluating academics and fundamental to the communication of research findings. Recently, the trend in scientific publishing has been towards the open access publishing model. One essential skill in publishing is selecting the right journal for a given research topic and scope. The proliferation of open access journals has expanded not only the number of legitimate journals but also that of predatory journals(PJs).[1–2] Similar to many open access journals, PJs also charge authors to publish, but offer limited or no peer review or any other quality-control measures. Predatory journals are those journals that receive and publish manuscripts from authors through different unethical publishing strategies such as aggressive marketing and spam emails promising quick publication but not a robust peer review, thus compromising the standards of scholarly publishing.[3] Since PJs do not follow standard research and publishing ethics, such journals are becoming a serious threat to the integrity of scientific evidence.[3] Manuscripts published in PJs do not attract attention of researchers, and about 60% of the published manuscripts are not cited at all.[4–6] In academia, manuscripts with many citations are considered major contributions to science, and authors with many publications are acclaimed in their fields. Likewise, journals that publish articles yielding many citations have the highest reputations. Ultimately, publishing a research result that describes new science and points to future research is a critical component of scientific advancement.[6–7]

Nowadays, many people rely on information retrieved through the Internet including articles published in PJs. Although the exact number of PJs remains unknown, it has been estimated that 8000 active PJs are published worldwide.[3] Allowing the continued online existence of publications that did not undergo rigorous peer review amounts to misrepresentation of scientific literature and has a negative effect on the body of knowledge. The publishers of PJs are motivated only by the opportunity to make money at the authors' expense without providing them the standard scientific publishing service.[3,8]

Publishers of PJs use different unethical publishing strategies to attract authors to submitting their scientific output to PJs. Some of the strategies include aggressive email advertising to a large number of scholars, not mentioning the publication fees on the journal's website or charging low submission fees, making false claims about the coverage of the journal in major databases and reputable indexing services, adding fake (non-existent) editors or listing well-known authors as members of the editorial board without their approval or knowledge, publishing in almost all fields of science, providing false impact

factors or other metrics, and promising rapid publication or rapid peer review, sometimes even within a week.[9–11]

Researchers, especially early-career researchers, at my university (University of Gondar, Ethiopia) are now confronted with many choices when selecting a journal for publication because of the boom of PJs, and our library receives many emails from our researchers seeking advice on the strategies to differentiate PJs from legitimate journals.

It is against this background that the present research sought to assess the awareness level of university researchers in Ethiopia with regards to PJs and to increase that level so that the researchers do not fall prey to PJs.

Materials and methods

Setting and participants

The Library Directorate conducted a training programme titled 'Avoiding publishing on PJs and publishers' on 25 July 2019 at the University of Gondar, Ethiopia. The university, until 2003 known as the Gondar College of Medical Sciences, is the oldest medical school in Ethiopia.[12] The target participants were faculty research coordinators, faculty promotion committee members, research and publication administrators, and journal editors.

The University of Gondar Institutional Review Board administration determined that administration of the survey did not require prior submission to the board since the proposed research was not considered as falling within the purview of 'human subjects research' as defined by the board.

The assessment was conducted as part of training activity to assess the awareness of participants. The training had three lectures, such as the process of academic publishing, PJs vs reputable journals, and the criteria to differentiate between the two. As part of a laboratory exercise, ten journals were selected and given to the participants for classifying the journals as PJs or legitimate journals. Some of the selected journals were predatory and some of them were reputable. The participants attempted to classify those journals using the criteria given to them. The training took 8 hours in total.

Survey

The Library Directorate designed the questionnaire for both pre- and post-programme evaluation using Google Forms.

The pre-evaluation survey consisted of 23 statements (6 of which, namely Q8.1 to Q8.5 and Q9.6, were added after the training). The first part of the survey (4 questions) comprised demographic questions; the second part (18 Likert-like scale questions) was about the awareness of researchers of PJ; and the last part (6 questions) requested participants to give, using free text, some feedback on the training and suggestions on how to avoid publishing in PJs and the impact of PJs.

In the demographic part of the survey, participants were asked to indicate their faculty affiliation, educational level, academic rank, and research experience. In the second part, participants were asked to indicate the extent to which they agree or disagree (using a Likert-like scale) to statements designed to assess their level of awareness of PJs and their publishers. The Likert-like scale was a 5-point scale, and the statements consisted of the criteria for PJs taken from different sources such as the Committee on Publication Ethics, Jeffrey Beal's articles, and other sources.[8, 13–14s]

The post-evaluation survey consisted mostly of closed-ended questions (requiring either Yes or No) and also included questions on the content of training, its duration, and whether it had been satisfactory. The participants were also requested to give, using free text, some feedback on the training and suggestions on how to avoid publishing in PJs and the impact of PJs.

Statistical analysis

The responses in the form of a spreadsheet (Excel) were downloaded from the Google doc's website, summarized using the mean and the median values, and compared using the paired-samples *t*-test; the software package SPSS ver.20 was used for analysing the results.

The responses in the form of free text (for example, suggestions provided by participants) were grouped on the basis of similarity to or association between the concepts. For example, suggestions such as preparing a whitelist, increasing awareness of PJs, updating the guidelines for faculty promotion, and encouraging and advising authors to publish in reputable journals were all put under the group 'suggestions on strategies to avoid publishing in PJs'.

Results

The pre-assessment questionnaire was emailed to 55 addresses a week before the training; 43 participants returned the completed questionnaire (80%). The post-evaluation questionnaire was sent to 43 participants, 37 of which returned the completed questionnaire (a response rate of 86%).

Characteristics of participants

Of the 43 participants, 38 (88%) were men and 5 (12%) were women. The median age of the participants was 39 years, and the range was 27–55 years.

The participants came from many faculties, distributed as follows: Medicine and Health Sciences (6), Natural Sciences (9), Social Sciences and Humanities (7), Business and Economics (5), Veterinary Medicine (3), Agriculture and Environmental Sciences (3), Law (2), Education (2), and Engineering and Technology (6).

Lecturers formed the largest group (19, or 44.2%), followed by assistant professors (17, or 39.5%), associate professors (6, or 14%), and one (2.3%) was a professor.

Level of awareness of predatory journals

The responses of participants to the pre-evaluation questionnaire are presented in Table 1. The awareness level was average (somewhat or moderately aware) for most of the statements except the last three statements; for those, the median values were 2 and 1 (slightly aware and not aware at all). The highest awareness was for statement No. 15, which was about the negative impact of PJs.

Table 1. Pre-assessment of participants' awareness of predatory journals

Q. No.	Statement or criterion used for differentiating PJs from legitimate journals	Not at all aware (1)	Slightly aware (2)	Somewhat aware (3)	Moderately aware (4)	Extremely aware (5)	Median
1	I know PJs may send an email invitation to attract manuscript submission.	2 (4.7%)	11(25.6%)	10(23.3%)	9(20.9%)	11(25.6%)	3.00
2	I know PJs promise rapid publication.	3 (7%)	11 (25.6%)	10 (23.3%)	7 (16.3%)	12 (27.9%)	3.00
3	I know PJs publish a high number of low-quality manuscripts.	2 (4.7%)	10 (23.3%)	10 (23.3%)	12 (27.9%)	9 (20.9%)	3.00
4	I know popular journal indexing databases and am able to check the existence of the journals in the databases.	9 (20.9%)	9 (20.9%)	9 (20.9%)	8 (18.6%)	8 (18.6%)	3.00
5	I know PJs may hide APC (fee) or disclose it after the manuscript has been accepted.	6 (14%)	10 (23.3%)	11 (25.6%)	13 (30.2%)	3 (7%)	3.00
6	I know PJs' contact information is not clearly stated on the journal website.	7(16.3%)	8 (18.6%)	12 (27.9%)	9 (20.9%)	7 (16.3%)	3.00
7	I know PJ author guidelines may not available on the website.	3 (7%)	15 (34.9%)	6 (14%)	13 (30.2%)	6 (14%)	3.00
8	I know PJ's scope might be broad, and sometimes they may use the word international or global.	6 (14%)	12 (27.9%)	8 (18.6%)	8 (18.6%)	9 (20.9%)	3.00
9	I know PJs may use more advertisements on the website unnecessarily.	4 (9.3%)	13 (30.2%)	11 (25.6%)	8 (18.6%)	7 (16.3%)	3.00
10	I know PJs may add fake (non-existing) editors or the names of well-known authors without their approval.	3 (7%)	16 (37.2%)	7 (16.3%)	9 (20.9%)	8 (18.6%)	3.00
11	I know PJs may use poor English on the journal website.	5 (11.6%)	13 (30.2%)	9 (20.9%)	7 (16.3%)	9 (20.9%)	3.00
12	I know the peer review process may not be clearly stated on the PJ's website.	6 (14%)	12 (27.9%)	6 (14%)	9 (20.9%)	10 (23.3%)	3.00
13	I know PJs may not follow standard research and publishing ethics.	12 (27.9%)	8 (18.6%)	3 (7%)	8 (18.6%)	12 (27.9%)	3.00
14	I know PJs may ask authors to send their paper by email instead of through a professional manuscript submission system.	8 (18.6%)	8 (18.6%)	9 (20.9%)	12 (27.9%)	6 (14%)	3.00
15	I know the negative impact of PJs on my career, institution, and body of knowledge.	4 (9.3%)	9 (20.9%)	6 (14%)	11 (25.6%)	13 (30.2%)	4.00
16	I know popular academic publishers.	11 (25.6%)	11 (25.6%)	6 (14%)	8 (18.6%)	7 (16.3%)	2.00
17	I know PJs may use false impact factors to attract manuscript submissions.	24 (55.8%)	8 (18.6%)	6 (14%)	3 (7%)	2 (4.7%)	1.00
18	I know PJs claim to have their articles indexed in popular databases such as Scopus, PubMed, the Web of Science, and DOAJ(Directory of Open Access Journals) but not in reality.	22 (51.2%)	15 (34.9%)	2 (4.7%)	2 (4.7%)	2 (4.7%)	1.00

The responses to the post-evaluation questionnaire are presented in Table 2. After the training, the participants' level of awareness was significantly increased except for statement No. 4, for which it was moderate. Statement No. 4 related to well-known journal indexing databases and mechanisms for verifying a journal's inclusion in those databases.

Table 2. Post-evaluation of participants' awareness of predatory journals

| Q. No.	Statement or criterion used for differentiating PJs from legitimate journals.	Not at all aware	Slightly aware	Somewhat aware	Moderately aware	Extremely aware	Median
1	I know PJs may send an email invitation to attract manuscript submission.	1 (2.7%)	0(0%)	2 (5.4%)	10 (27%)	24 (64.9%)	**5**
2	I know PJs promise rapid publication or rapid peer review.	1 (2.7%)	0 (0%)	1 (2.7%)	8 (21.6%)	27 (73%)	**5**
3	I know PJs publish a high number of low-quality manuscripts.	1 (2.7%)	0 (0%)	1 (2.7%)	11 (29.7%)	24 (64.9%)	**5**
4	I know popular journal indexing databases and am able to check the existence of the journals in the databases.	0 (0%)	0 (0%)	6 (16.2%)	15 (40.5%)	16(43.2%)	**4**
5	I know PJs may hide APCs (fees) or disclose them only after the manuscript has been accepted.	1 (2.7%)	0 (0%)	3 (8.1%)	11 (29.7%)	22 (59.5%)	**5**
6	I know PJs' contact information is not clearly stated on the journal website.	0 (0%)	0 (0%)	4 (10.8%)	11 (29.7%)	22 (59.5%)	**5**
7	I know PJs author guidelines may not be available on the website.	1 (2.7%)	0 (0%)	0 (0%)	3 (8.1%)	20 (54.1%)	**5**
8	I know PJs' scope might be broad, covering almost all fields of science. Sometimes they may use the word *international* or *global*.	1(2.7%)	0 (0%)	3 (8.1%)	12 (32.4%)	21 (56.8%)	**5**
9	I know PJs may use more advertisements on the website unnecessarily.	0(0%)	0 (0%)	2 (5.4%)	11 (29.7%)	24 (64.9%)	**5**
10	I know PJs may add fake (non-existing) editors or the names of well-known authors without their approval.	1(2.7%)	0 (0%)	3 (8.1%)	10 (27%)	23(62.2%)	**5**
11	I know PJs may use poor English on the journal's website.	0 (0%)	0 (0%)	3 (8.1%)	12 (32.4%)	22 (59.5%)	**5**
12	I know the peer review process may not be clearly stated on the PJ's website.	0(0%)	1 (2.7%)	1 (2.7%)	12 (32.4%)	23 (62.2%)	**5**
13	I know PJ may not follow standard research and publishing ethics.	0 (0%)	0 (0%)	5 (13.5%)	11 (29.7%)	21 (56.8%)	**5**
14	I know PJs may ask authors to send their manuscripts by email instead of through a professional manuscript submission system.	1 (2.7%)	1 (5.4%)	2 (5.4%)	12 (32.4%)	21 (56.8%)	**5**
15	I know the negative impact of PJs on my career, institution, and body of knowledge.	0 (0%)	2 (5.4%)	2 (5.4%)	12 (32.4%)	23 (62.2%)	**5**
16	I know popular academic publishers.	0(0%)	0 (0%)	5 (13.5%)	10 (27%)	21 (56.8%)	**5**
17	I know PJs may use false impact factors to attract manuscript submissions.	6 (16.2%)	1 (2.7%)	3 (8.1%)	4 (10.8%)	23 (62.2%)	**5**
18	I know PJs claim to have their articles indexed in popular databases such as Scopus, PubMed, the Web of Science,and DOAJ (Directory of Open Access Journals) but not in reality.	2 (5.4%)	1 (2.7%)	2 (5.4%)	6 (16.2%)	26 (70.3%)	**5**
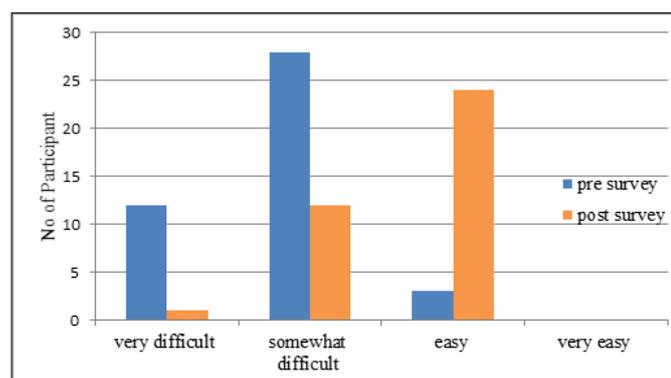
Figure 1. Participants' assessment of their ability to differentiate PJs from legitimate journals

In the pre-evaluation, most of the participants replied that differentiating PJs from legitimate journals was somewhat difficult. As shown in Figure 1, 28, or 65%,of the participants reported that differentiating PJs from legitimate journals was somewhat difficult;12, or 28%, reported that it was very difficult; and only 3,or 7%, reported that it was easy. On the other hand, in the post-evaluation, only one participant reported that the task was very difficult; 12, or 32%, reported that it was somewhat difficult; and 24, or 65%, reported that it was easy.

Participants were asked to explain briefly, using free text, what mechanisms institutions should use to avoid PJs, regardless of the experience of researchers. The responses included the following: creating awareness and offering training on PJs, preparing an updated blacklist and an updated whitelist at the institutional level, preparing guidelines, offering consultations to early-career researchers, providing incentives to authors who publish in legitimate journals, ignoring publications in PJs in considering promotions, and setting up a committee to advise researchers by identifying PJs.

The difference between pre-assessment and post-assessment regarding the awareness of participants of PJs was significant ($p<0.001$): the mean score (M±SD) for pre-assessment was 2.78 ± 0.73 whereas that for post-assessment was 4.94±0.23.

Discussion

The survey showed that many researchers were unaware of the potential distinctions between PJs and legitimate journals distinctions that were crucial to choosing an appropriate journal for publishing.

Predatory journals are many and their number keeps increasing with time. Researchers and institutions should, therefore, be aware of the criteria used for distinguishing between predatory and legitimate journals and should practise evaluating journals based on the recommended criteria. Although many researchers in the present study had heard of PJs, they were unable to distinguish PJs from legitimate journals. Awareness was especially low on the impact factor, journal indexing services, and reputable publishers (Table 1). The researcher found during the laboratory exercise that if a journal had a high impact factor, the participants regarded the journals trustworthy. However, the impact factor is not always a reasonable indicator, because many PJs claim fake impact factors. To appear legitimate, some PJs link their claim about the impact factor to a certificate or a recommendation letter, which is completely wrong and unnecessary.[15–16]Another important

item associated with PJs is the indexing of manuscripts published in them by major databases and indexing services. During the laboratory exercise, the researcher observed that the participants considered a journal trustworthy if it claimed that it was indexed in reputable indexing databases such as Scopus.

Many PJs claim to be indexed in reputable bibliographic or indexing databases such as Scopus, PubMed, Web of Science, and DOAJ (directory of Open Access Journals) but such claims are false. As a result, manuscripts published in these PJs are unlikely to add to the global body of knowledge.[16]Therefore, although the journals may claim that they are indexed in reputable indexing databases, researchers must cross-check whether the journal in question is in fact being indexed by these databases or ask their librarian to confirm the claim if possible.

Although the level of awareness of PJs was higher in the post-evaluation questionnaire, 12, or 32%, of the participants reported that it was somewhat difficult to differentiate clearly between PJs and legitimate journals. Given the staggering number of journals both legitimate and predatory, it is increasingly difficult to tell them apart. Apart from the proliferation of journals, PJs mimic or even clone the titles of well-known or prestigious journals. Sometimes, a PJ's logo resembles that of a reputable journal. Since the main aim of PJs is to make money at authors' expense and disregard standard publishing ethics, they use many different strategies to convince authors to submit their work to PJs. This makes the challenge of differentiating between legitimate and PJs especially hard for young researchers. Therefore, before manuscript submission, irrespective of the publishing model, authors and institutions ought to know and practise evaluating and reviewing journals on the basis of the following important aspects so that the distinction between PJs and legitimate journals becomes simple and clear cut.[4, 17–18]

Article processing charges. During the pre-assessment, six, or 14%, of the participants were not aware that PJs do not disclose their APCs (article processing charges) on the web sites or disclose them only after the manuscript has been accepted. During the laboratory exercise, the participants were able to find information about APCs levied by legitimate journals easily enough on their website but the task proved difficult in the case of PJs.

Mostly, PJs do not want to specify their APCs on their websites: transparency regarding publication fees is lacking in the case of PJs. They hide their APCs or disclose them only after the manuscript has been accepted. If no publication fees are charged, that should also be clearly stated on the website. Most of the PJs' article processing or publication charges are very low (less than $150).[6]

Members of editorial boards. During the pre-assessment, ten participants were not aware of the false claims made by PJs about the composition of their editorial boards. The members' contact information, institutional affiliation, academic expertise, and geographical diversity especially for journals that claim to be international have to be clearly stated. Researchers need to be made aware that PJs may claim to have well-known authors on their editorial boards without the approval or knowledge of those authors.[9,19]

Peer review process. Six, or14%, of the participants during

the pre-assessment were unaware of the peer review process. A journal's website must be examined to obtain information about whether articles are peer reviewed, and it is also necessary to check the quality of articles published in a given journal from its archives. Typically, PJs do not follow standard research and publishing ethics whereas a manuscript should undergo peer review to ensure scientific validity and quality.[20]

Journal's aim and scope. The aims and scope of PJs are seldom clearly defined. The scope of most PJs is too broad, covering almost all fields of science, and they often publish manuscripts that are far outside the scope of the journal.[21] Sometimes PJs may use such words as *international*, *global*, or *world* in their titles. However, if the scope of the journal is claimed to be international or global, the composition of its editorial board should also be international in terms of both location and academic expertise.

Impact factor. Awareness of false claims about a journal's impact factor to attract submissions was very low (the median value was 1, as can be seen in Table 1). To appear legitimate, sometimes PJs link their impact factor to a certificate or a recommendation letter or even to a different website to convince potential authors. Librarians can help in confirming the authenticity or otherwise of such claims.[6]

Email solicitations. During the pre-assessment, two, or 5%, of the participants were unaware of aggressive email invitations sent out by PJs to attract submissions. These invitations are sent out in large numbers. Participants were advised not to reply to such invitations.

Wide advertising. Four, or 9%, of the participants were unaware that PJs advertise widely, promising rapid publication, even within a week of submission, rapid peer review, and low submission APCs. Also, as mentioned earlier, many PJs use titles deceptively similar to those of better-known or more prestigious journals. Sometimes, not only the PJ's logo resembles that of a reputable journal[22] but also the overall look and feel of the PJ's website matches that of a reputable journal.

Poor website. Five, or 12%, of the participants were unaware of the implications of a PJ's poorly designed website. Most PJs have websites that are far from standard or are of poor quality. The website may have grammatical errors or those of spelling and may feature unnecessary symbols and dead links. The text of advertisements and of published articles may also contain numerous typographical or grammatical errors.[22]

Manuscript submission system. Eight, or 18%, of the participants were unaware that PJs use personal mail systems for manuscript submission, whereas legitimate journals have professional manuscript submission systems, which require authors to upload the manuscripts onto a system instead of sending them to a personal email id.[3]

Contact information. Seven, or 16%, of the participants were unaware that PJs avoid giving clear and valid contact information on their websites and rarely provide such details as institutional email ids, telephone numbers, and adequate mailing address. Absence of such information means that authors cannot get in touch with the publishers or editors of PJs by any means other than emails—and even the email ids are typically not institutional but of such web-based services as Yahoo and Gmail.[3]

In post-evaluation too, the participants were asked to explain briefly, using free text, the impact of PJs and ways of avoiding publishing in them. Most of the participants mentioned that publications in PJs do not count for promotion and suggested that the faculty prepare guidelines for academic publishing and make faculty members aware of the need to avoid submitting manuscripts to PJs.

Apart from promotion, other critical impacts of publishing in PJs include the authors' weakened credibility, adverse implications for the institutions to which the authors are affiliated, and damage to the trustworthiness of the body of knowledge. If authors publish in PJs, they miss out on citations and visibility although the publications may have been of high quality. This jeopardizes the researchers' scientific careers and reputations and weakens their CVs. The result is disqualification from grant competitions, scholarships, or jobs.[16, 23] Predatory journals also damage the reputations of the affiliated institutions, and the damage is reflected in the institutions' ranking or visibility. Such publishing also makes the body of knowledge less trustworthy because publications in PJs appear without any critical peer review. The problems is particularly serious for health sciences because any recommendations or treatments published in such journals may be implemented uncritically, with potentially disastrous consequences.[23–24] It is therefore important to examine the current rules governing faculty promotions, prepare updated blacklists and whitelists, focus on the quality rather than the quantity of publications for promotions, keep increasing researchers' awareness of the dangers of publishing in PJs, and guide young researchers. Institutions should reward those who publish in reputable journals and discourage those who publish in PJs or consent to serve on their editorial boards.

Additionally, authors can refer to the following sites and resources for more information: ThinkCheckSubmit (http://thinkchecksubmit.org), Beall's criteria, European Association of Science Editors (EASE), World Association of Medical Editors (WAME), the Committee on Publication Ethics (COPE), International Committee of Medical Journal Editors (ICMJE), Council of Science Editors (CSE), and Open Access Scholarly Publishers Association (OASPA).[21, 25]

Through workshops and mentoring, it is necessary to educate authors about critical evaluation of articles and important aspects of publishing, guiding them on avoiding PJs and selecting the most appropriate journals for their work. Although the survey explicitly identified the research experiences of the respondents, it did not address their publishing experiences. Also, the survey may have been influenced by the lack of publishing experience of some respondents, particularly the early-career researchers, and future surveys should take this factor into account. We need to engage prospective researchers and mentors in discussions about the choice of journals for submitting manuscripts. Institutions should also safeguard the interests of their faculty or staff by making them capable of identifying PJs and making them conscious of the necessity to publish in legitimate journals.

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Competing interests

The authors declare there are no competing interests.

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