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OPINION

Predatory Journals Spamming for Publications: What Should Researchers Do?

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Abstract In the internet era spam has become a big problem. Researchers are troubled with unsolicited or bulk spam emails inviting them to publish. However, this strategy has helped predatory journals hunt their prey and earn money. These journals have grown tremendously during the past few years despite serious efforts by researchers and scholarly organizations to hinder their growth. Predatory journals and publishers are often based in developing countries, and they potentially target researchers from these counties by using different tactics identified in previous research. In response to the spread of predatory publishing, scientists are trying to develop criteria and guidelines to help avoid them—for example, the recently reported "predatory rate". This article attempts to (a) highlight the strategies used by predatory journals to convince researchers to publish with them, (b) report their article processing charges, (c) note their presence in Jeffrey Beall's List of Predatory Publishers, (d) rank them based on the predatory rate, and (e) put forward suggestions for junior researchers (especially in developing counties), who are the most likely targets of predatory journals.

Keywords Editorial policy · Impact factor · Peer review · Predatory journals · Research fraud

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Introduction

As use of the internet increases, researchers receive rising numbers of spam emails. For the scientific community in particular, unsolicited or bulk emails the submission of publishable papers is irritating and annoying (Moher and Srivastava 2015). However, email invitations have been an attractive way for predatory journals and publishers to target their victims. Often researchers receive many emails from predatory journals with a "call for papers", promising fast review with quick publication, and claiming to be indexed or to have a high impact factor (Moher and Srivastava 2015). Predatory open access publishers are fee-collecting repositories that do not follow established academic practices for publication (Masten and Ashcraft 2016) and abuse the author-pays publishing model for their own benefit (Beall 2013). Such journals that exploit the pay-to-publish model have tremendously increased from 18 in 2011 to 1155 in 2017, particularly in Asia (Beall 2017a, b; Moher and Srivastava 2015).

Unfortunately, the particular targets and ultimately the most likely victims of predatory journals are junior and inexperienced researchers from low and middle income countries, especially from South Asia (Clark and Smith 2015). This situation arises from the publish or perish mantra (which tends to make the quantity of papers more important than their quality), a lack of guidance and support, and less well established higher education and mentorship systems in these countries (Clark and Thompson 2016; Clark and Smith 2015). Though limited, Jeffery Beall's blog (Beall 2017a) remained the primary source of information, often consulted to avoid potential or possible predatory journals and publishers. Unfortunately, the blog and lists were removed early in 2017, leaving behind many questions (Memon 2017a). Archived copies of Beall's lists however, can still be viewed (https://web.archive.org/web/20170111172309/https://scholarlyoa.com/individual-journals/) (Memon 2017a).

The scientific community has been badly troubled by predatory journals and publishers, even after measures have been taken to defuse their influence through research on guidelines for detecting them and discussions of ways to better understand their common characteristics and deceptive tactics (Dadkhah and Bianciardi 2016a, b; Roberts 2016b). Also, in recent years, researchers have proposed sets of criteria for identifying potential predatory journals and publishers (Petrişor 2016). One recent tool called the "predatory rate"[1] is a novel criterion proposed by Dadkhah and Bianciardi (2016a) to detect such journals. The present article attempts to (a) highlight the strategies used by predatory journals to convince researchers to publish with them, (b) report their article processing charges, (c) note their presence in Beall's list, (d) rank them based on the predatory rate, and (e) put

[1] This is an approach of ranking predatory journals based on Beall's criteria for detection of predatory journals. The criteria for ranking a predatory journal is based on a journal's editorial section (Email, Affiliation, and Number of editors), review process and publishing (Review time, Unclear review process, Number of papers in each issue, Questionable special issue), announcement (Availability of journal full address, Using bogus metric and index, Send journal spam email to receive papers), and OA policies and publication charges (Fast track fee, Submission fee, Publication Fee, Charging both authors and readers). The total weighted predatory rate (PR) score ranges between 0 and 1 where score greater than 0.22 reflects a predatory journal, greater than 0 and lower than 0.22 reflects a journal with predatory practices, and 0 value confirms a non-predatory journal.

forward suggestions for junior researchers (especially in developing counties), who are the most likely targets of predatory journals.

What are the Common Features of Predatory Journals?

Wahyudi provided a generic structure based on 25 calls for manuscript submissions, which may be helpful to early-career and developing country researchers (Wahyudi 2017). These characteristics help junior and less experienced researchers to distinguish legitimate journals from dubious or fraudulent journals. Some of the features are given below:

1. Use of attractive words in the journal title, such as "international", "global", "world", "universal", "Asian", "American" or "European" (Beall 2013; Masten and Ashcraft 2016; Petrişor 2016).
2. Frequently a multidisciplinary scope and broad coverage of subjects and combinations of fields which may not necessarily be specific to the journal (Petrişor 2016).
3. Location in low and middle income countries such as India, "where new predatory publishers or journals emerge each week", Pakistan or Nigeria, although often claiming an address in the US or UK (Clark and Smith 2015; Petrişor 2016; Pulla 2016; Shyam 2015). However, predatory journals may also emerge from developed countries, and journals from developed countries may be involved in predatory practices (Bohannon 2013).
4. Abuse of the Committee on Publication Ethics (COPE) logo by simply placing it on their homepage without really being COPE members (Roberts 2016a).
5. Promising a short or ultra-short review cycle ranging from a few days to a few weeks, or providing authors with a fast-track option which costs extra (Dadkhah and Bianciardi 2016a; Petrişor 2016).
6. Claiming indexation in legitimate databases such as PubMed, Directory of Open Access Journals (DOAJ) or even Web of Science, where they do not appear (Roberts 2016a). Also, using disreputable databases such as Indian Science Indexing (ISI), and mimicking the logo of the legitimate journal impact factor (Dadkhah and Bianciardi 2016a).
7. Using fake impact factors such as the Global Impact Factor (GIF), the "Journal Impact Factor (JIF)" (not to be confused with the genuine JIF issued by Clarivate Analytics), Scientific Journal Impact Factor (SJIF), or Universal Impact Factor (UIF) (Jalalian 2015).
8. Using general email addresses usually from free providers such as gmail.com, yahoo.com, etc. (Beall 2013; Dadkhah and Bianciardi 2016a).
9. Lack of any contact details, or only a blank form in the link to full contact details (Dadkhah and Bianciardi 2016a).
10. "Questionable special issues" outside the journal's scope, and large numbers of published papers in a given issue (Dadkhah and Jazi 2015; Dadkhah and Bianciardi 2016a).

11. Sending unsolicited or bulk spam emails inviting applications for editor or reviewer positions, or manuscript submissions ("call for papers") from different accounts (Beall 2013; Moher and Srivastava 2015).
12. Very few editorial board members, overrepresentation of a single country on the editorial board, or lack of information about editorial members' affiliations (Beall 2013; Dadkhah and Bianciardi 2016a).
13. Hidden article processing charges (APCs) or APCs displayed but different from the fees charged by reputable journals for the open access option (Dadkhah and Bianciardi 2016a).

What was Found?

The emails sent to the author by journals and publishers during the period between 19 March 2015 and 27 December 2016 were collected. The email account used in this analysis was the one used in the scholarly publications of this author (dpt.aamir@gmail.com). Emails from publishers such as Springer, Sage, and Medknow Publications were excluded from analysis. The analysis was performed by collecting the emails (text and attachments) and the corresponding web pages of each journal or publisher. Where necessary, other sources such as Beall's list, PubMed, DOAJ and the databases of Thomson and Reuters (now Clarivate Analytics) were taken into account.

Email invitations to submit research manuscripts were received from 32 predatory journals, one hijacked journal and four predatory publishers. Hijacked journals are journals that use the name and ISSN of an authentic, reputable journal to attempt to deceive researchers (Jalalian and Dadkhah 2015; Memon 2016). Hijacked journals are more problematic and difficult to distinguish; they often receive more submissions than predatory journals because they use the name and reputation of legitimate journals, although they are often from non-Anglophonic countries (Dadkhah et al. 2016; Memon 2016). Table 1 summarizes the information about the strategies used by dubious and fraudulent journals, their article processing charges, and rank according to predatory rate.

The common features identified were as follows:

1. Most journals used interesting names with the word "international" in their title, and some used the word "American", "Asian" or "Global" in their title.
2. They used fake scientometrics such as the Global Impact Factor, Index Copernicus Value, Scientific Journal Impact Factor, and Quality Impact Factor. Some of them tried to copy the logo used by Thomson Reuters (now Clarivate Analytics).
3. They were broad in scope with huge numbers of papers per issue.
4. They claimed to be indexed by popular databases such as PubMed, DOAJ, EBSCO and Scopus. They also tried to deceive researchers by claiming indexation or membership in ResearcherID, Mendeley, CrossRef, ProQuest, WAME, Thomson Reuters, International Committee of Medical Journal

Table 1 Details of journals that spam for publications and their strategies to attract researchers

	Journal name	Website	Strategy to attract researchers	APCs	Predatory Rate (PR)
1	International Journal of Current Research (IJCR)[b]	www.journalcra.com	*Impact factor* SJIF, ICV, QIF *Indexation* PubMed, ResearcherID, EndNote, DOAJ, JIF *Publication process* Quick but exact duration not given *Others* Certificate to the authors, broader scope, open access *Contact* Details not given (only an Indian Whatsapp Number) *Email* editor@journalcra.com	Yes but not clear ("very nominal")	0.714
2	International Journal of Development Research (IJDR)[b]	www.journalijdr.com	*Impact factor* SJIF *Indexation* ResearcherID, mendeley, EndNote, DOAJ, Thomson Reuters *Publication process* Acceptance/rejection notification within 5 days after submission *Others* Certificate to the authors, thesis submission, broader scope, open access *Contact* details not given *Email* editor@journalijdr.com	Yes but not clear	0.643
3	Account and Financial Management Journal[c]	www.everant.org/index.php/afmjh	*Impact factor* Details not given *Indexation* CrossRef, ResearcherID *Publication process* Acceptance notification within three days from the date of manuscript submission *Others* Certificate to the authors, Open Access *Contact* India *Email* Details not given	70USD	0.357

Table 1 continued

	Journal name	Website	Strategy to attract researchers	APCs	Predatory Rate (PR)
4	International Journal of Current Science and Technology[b]	www.journalijcst.com	*Impact factor* GIF, ICV *Indexation* Fake agencies *Publication process* Inform authors regarding acceptance within one month *Others* Certificate to the authors, book submission, broader scope, open access *Contact* Details not given *Email* journalijcst@gmail.com	120USD	0.5
5	International Journal of Recent Scientific Research (IJRSR)[b]	www.recentscientific.com	*Impact factor* SJIF, ICV, JIF *Indexation* PubMed, ResearcherID, EndNote, CrossRef, ProQuest, DOAJ, EBSCO, Scopus, Medline, HINARI *Publication process* It is the goal of the IJRSR to publish accepted manuscripts within 2 weeks after submission *Others* Certificate to the authors, books and thesis, broader scope, open access *Contact* Details not given (except Indian contact number) *Email* recentscientific@gmail.com and editorinchiefijrsr@gmail.com	Not clear	0.643

Table 1 continued

	Journal name	Website	Strategy to attract researchers	APCs	Predatory Rate (PR)
6	Asian Journal of Science and Technology (AJST)[b]	www.journalajst.com	*Impact factor* SJIF *Indexation* ProQuest, CrossRef, EBSCO *Publication process* Acceptance status of your manuscript within 3 days from the date of submission and within subsequent 10 days, completion of the publication process *Others* Certificate to the authors, Broader scope, Open Access *Contact* Details not given *Email* editor@journalajst.com and haimani_2003@yahoo.com	Yes but details not found	0.643
7	International Journal of Innovation Science and Research (IJISR)[b]	www.ijisr.com	*Impact factor* Details not found *Indexation* PubMed, ProQuest, CrossRef, DOAJ, EBSCO? *Publication process* Details not given *Others* Broader scope, Thesis, Open Access *Contact* Details not given *Email* editor@ijisr.com	60USD	0.357
8	International Journal of Recent Advances in Multidisciplinary Research (IJRAMR)[b]	www.ijramr.com	*Impact factor* SJIF *Indexation* CrossRef, DOAJ, EBSCO, NCBI *Publication process* Acceptance notification within 4–6 days, and decision made by editorial board within two weeks *Others* Certificate to the authors, thesis submission, broader scope, open access *Contact* Details not given *Email* editor@ijramr.com and articles@ijramr.com	60USD	0.571

Table 1 continued

	Journal name	Website	Strategy to attract researchers	APCs	Predatory Rate (PR)
9	International Journal of Current Agricultural Sciences (IJCAS)[b]	www.journalijcas.com	*Impact factor* Impact factor but details not given *Indexation* Details not given, all fake agencies *Publication process* It is the goal of the IJCAS to publish manuscripts within 1 week after submission *Others* Certificate to the authors, broader scope, open access *Contact* India *Email* journalijcas2015@gmail.com	Yes but details not given	0.5
10	International Journal of Current Multidisciplinary Studies[b]	www.journalijcms.com	*Impact factor* SJIF *Indexation* CrossRef, DOAJ, ResearcherID *Publication process* It is the goal of the IJCMS to publish manuscripts within 1 week after submission *Others* Certificate to the authors, book submission, open access, broader scope *Contact* Details not given *Email* Details not given	Yes but details not found	0.571
11	Global Journal For Research Analysis(GJRA)[b]	www.worldwidejournals.com/global-journal-for-research-analysis-GJRA/	*Impact factor* SJIF, ICV *Indexation* CrossRef *Publication process* Up to 4 working days to peer review *Others* Book publication, Broader scope, journal statistics, open access *Contact* India *Email* gjra@worldwidejournals.com	100-400USD	0.643

Table 1 continued

	Journal name	Website	Strategy to attract researchers	APCs	Predatory Rate (PR)
12	International Journal of Information Research and Review(IJIRR)[b]	www.ijirr.com	*Impact factor* SJIF *Indexation* Details not given *Publication process* Details not given but claimed to be fast track *Others* Certificate to the authors, broader scope, open access *Contact* Details not given *Email* articles@ijirr.com and editor@ijirr.com	60USD	0.571
13	International Journal of Scientific Research(IJSR)[b]	https://www.worldwidejournals.com/international-journal-of-scientific-research-(IJSR)/	*Impact factor* SJIF, ICV *Indexation* PubMed, CrossRef *Publication process* Up to 4 working days to peer review *Others* Book publication, broader scope, journal statistics, open access *Contact* India *Email* ijsr@worldwidejournals.com	100-400USD	0.643
14	Paripex-Indian Journal of Research(PIJR)[b]	www.worldwidejournals.com/paripex/	*Impact factor* SJIF, ICV *Indexation* CrossRef *Publication process* Up to 4 working days to peer review *Others* Book publication, broader scope, journal statistics, open access *Contact* India *Email* editor@paripex.in	100-400USD	0.643

Table 1 continued

	Journal name	Website	Strategy to attract researchers	APCs	Predatory Rate (PR)
15	International Journal of Scientific Research and Management (IJSRM)[b]	www.ijsrm.in	*Impact factor* ICV *Indexation* DOAJ, CrossRef *Publication process* Details not given *Others* Broader scope, open access *Contact* India *Email* editor@ijsrm.in	90USD	0.357
16	International Journal of Engineering and Science Invention[b]	www.ijesi.org	*Impact factor* Impact factor, h-index, i10-index *Indexation* DOAJ, WAME, EBSCO, ProQuest *Publication process* Entire process will be completed expected within 12–15 days *Others* Certificate to authors, broader scope, open access, journal statistics *Contact* Details not given *Email* Details not given	75USD	0.571
17	International Journal of Scientific Research (IJSR)[b]	www.journalijsr.com	*Impact factor* Details not given *Indexation* Details not given *Publication process* Details not given *Others* Open access, Broader scope *Contact* India *Email* info@journalijsr.com	45USD	0.357

Table 1 continued

	Journal name	Website	Strategy to attract researchers	APCs	Predatory Rate (PR)
18	International Journal of Nursing Didactics (IJND)[c]	www.innovativejournal.in/ijnd/index.php/ijnd	*Impact factor* Impact factor *Indexation* CrossRef, Thmoson Reuters *Publication process* Acceptance notification within 1–2 days after submission *Others* Certificate to authors, open access *Contact* Details not given *Email* ijnd2011@gmail.com and ijnd2014@rediffmail.com	160USD	0.714
19	International Journal of Dental and Medical Specialty[c]	http://www.renupublishers.com/index.php/journl/journlpage?id=IJDMS	*Impact factor* ISI, ICV, JIFACTOR, GIP IF *Indexation* EBSCO, HINARI *Publication process* Details not found *Others* Open access, broader scope *Contact* India *Email* editor.ijdms@gmail.com	90-130USD	0.43
20	Indian Journal of Applied Research[b]	https://www.worldwidejournals.com/indian-journal-of-applied-research-(IJAR)/	*Impact factor* SJIF, ICV *Indexation* CrossRef *Publication process* Up to 4 working days to peer review *Others* Book publication, broader scope, journal statistics, open access *Contact* India *Email* editor@ijar.in	100-400USD	0.643

Table 1 continued

	Journal name	Website	Strategy to attract researchers	APCs	Predatory Rate (PR)
21	International Invention Journal of Arts and Social Sciences (IIJASS)[c]	www.internationalinventjournals.org/journals/IIJASS/home.html	*Impact factor* ISI Master List under evaluation *Indexation* Details not given *Publication process* Inform authors of the decision on their manuscript(s) within two weeks of submission *Others* Online, broader scope *Contact* Details not given *Email* iijass@internationalinventjournals.org	400USD	0.571
22	Standard Global Journal of Geology and Explorational Research (SGJGER)[c]	www.standardglobaljournals.com/journals/SGJGER/home.html	*Impact factor* Details not given *Indexation* Details not given *Publication process* It is the goal of the SGJGER to publish manuscripts within 4 weeks after submission. *Others* Open access *Contact* African Countries *Email* standglobaljournals.articles@gmail.com and sgjger@standardglobaljournals.com	550USD	0.643
23	American Research Journal of History and Culture[c]	www.arjonline.org/journal-info/american-research-journal-of-history-and-culture	*Impact factor* Details not given *Indexation* Details not given *Publication process* Details not given *Others* Open access, broader scope *Contact* USA *Email* arjhc_editor@arjonline.org	250USD	0.286

Table 1 continued

	Journal name	Website	Strategy to attract researchers	APCs	Predatory Rate (PR)
24	International Journal of Contemporary Research and Review[b]	www.ijcrr.in	*Impact factor* ICV *Indexation* DOAJ *Publication process* Details not given *Others* Open access, broader scope *Contact* Details not given *Email* editor@ijcrr.in	170USD	0.786
25	International Journal of Current Engineering Sciences(IJCES)[b]	www.journalijces.com	*Impact factor* SJIF *Indexation* ResearcherID, EndNote *Publication process* It is the goal of the IJCAR to publish manuscripts within 1 week after submission *Others* Certificate to the authors, broader scope, open access, book submission *Contact* Details not given *Email* journalijces2015@gmail.com	55-65USD	0.643
26	Management and Economic Journal[c]	www.everant.in/index.php/mej	*Impact factor* Details not given *Indexation* Details not given Publication process within 3–4 days after submission *Others* Certificate to authors, open access, broader scope *Contact* India *Email* editor@everant.in	Details not given	0.357

Table 1 continued

	Journal name	Website	Strategy to attract researchers	APCs	Predatory Rate (PR)
27	Excellent Word Journal of Education Review (EWJER)[c]	www.excellentwordjournals.com/index.html or www.excellentwordjournals.org	Not accessible		
28	SM Journal of Community Medicine (SMCM)[c]	www.smjournals.com/index.php/community-medicine	*Impact factor* Details not given *Indexation* Details not given *Publication process* Details not given *Others* Open access *Contact* USA *Email* submissions@smjournals.org	Details not given	0.571[d]
29	International Journal of Current Agriculture Research (IJCAR) modified to International Journal of Current Agricultural Research (IJCAR)[c]	www.journalagri.com modified to www.wrpjournals.com/journal-title/international-journal-current-agricultural-research	*Impact factor* Mentioned but details not given *Indexation* EBSCO, CrossRef, Thomson Reuters *Publication process* Details not given *Others* Details not given *Contact* Details not given *Email* articles@journalagri.com	75 USD	1
30	International Journal of Research and Current Development (IJRCD)[b]	http://www.journalijrcd.com/	*Impact factor* Provided but details not given *Indexation* Details not given *Publication process* Details not given *Others* Certificate to the authors, broader scope, open access, book submission *Contact* India *Email* journalijrcd@gmail.com	Details not given	0.43

Table 1 continued

	Journal name	Website	Strategy to attract researchers	APCs	Predatory Rate (PR)
31	Epidemiology: Open Access[c]	www.omicsonline.org/epidemiology-open-access.php	*Impact factor* ICV, JIF *Indexation* Details not given *Publication process* 21 days rapid review process *Others* Broader scope, open access *Contact* USA *Email* editor.epidemiology@omicsonline.net	1819 USD	0.43
32	Orthopedics and Rheumatology Open Access Journal[c]	www.juniperpublishers.com/oroaj/ or www.medcraveonline.com/MOJOR/	*Impact factor* Details not given *Indexation* ICMJE, CrossRef *Publication process* Authors are usually informed within a week about the acceptance or rejection of their article *Others* Open access *Contact* USA *Email* orthopedics@juniperpublishers.org	249-1049 USD	0.5
1	Innovative Journals[c] (Publisher)	www.innovativejournal.in	*Impact factor* ICV, SJIF *Indexation* EBSCO, DOAJ, CrossRef, Thomson Reuters Publication process Acceptance notification varies but within 2 weeks after submission *Others* Certificate to authors, open access *Contact* Details not given *Email* Corresponds to the journal	160USD	N/A

Table 1 continued

	Journal name	Website	Strategy to attract researchers	APCs	Predatory Rate (PR)
2	Global Journals[c] (Publisher)	www.gifre.org	*Impact factor* ICV, GIF, SJIF *Indexation* Details not found *Publication process* The review process may take 05 days to 07 days. *Others* Open access *Contact* Details not given *Email* Corresponds to the journal	Yes but details not given	N/A
3	Scholars Academic & Scientific Publishers[c] (Publisher)	www.saspjournals.com, www.saspublisher.com	*Impact factor* ICV *Indexation* PubMed *Publication process* Fast review process-review process completes within maximum 7 days *Others* Open access, broader scope *Contact* India *Email* Corresponds to the journal (saspjournals@gmail.com)	25-50USD	N/A
4	InTech Open Access Books[c] (Publisher)	www.intechopen.com or http://www.intechopen.com/welcome/47aae7462a443aecec15ab83ef361df3/dpt.aamir@gmail.com	*Impact factor* N/A *Indexation* Book citation index *Publication process* Details not found *Contact* Croatia *Email* lipovic@intechopen.com	350 EUR (per chapter)	N/A

Table 1 continued

	Journal name	Website	Strategy to attract researchers	APCs	Predatory Rate (PR)
1	Transylvanian Review[a] (Hijacked)	Original: http://www.centruldestudiitransilvane.ro/Detaliu.aspx?t=prezentare Hijacked: http://transylvanianreviewjournal.org/index.php/TR/index	*Impact factor* JCR *Indexation* Scopus, SSCI *Publication process* Details not given *Others* Broader scope, open access *Contact* Details not given *Email* transylvanianreview@gmail.com	Details not found	N/A

Data tracked until: 19/03/2015

APC Article processing charges, *SJIF* scientific journal impact factor, *ICV* index copernicus value, *QIF* quality impact factor, *DOAJ* directory of open access journals, *JCR* journal citation report, *SSCI* social sciences citation index, *JIF* journal impact factor, *GIF* global impact factor, *N/A* not applicable, *ISI* institute for scientific information

[a] Hijacked journal

[b] Included in Beall's list of individual journals @ https://scholarlyoa.com/individual-journals/ [27.12.2016]

[c] Included in Beall's list of predatory publishers @ https://scholarlyoa.com/publishers/ [27.12.2016]

[d] Missing fields were scored

Editors (ICMJE) and HINARI. Moreover, they were also indexed in questionable indexation databases.
5. The review process in most journals was not clear, and the length of the publication process ranged between 3 days and a few weeks (<6 weeks).
6. The article processing charges were either hidden or ranged between USD 45 and USD 1819.
7. Contact details were either hidden or from African countries or India, or in some cases from the USA.
8. General email services such as gmail.com or yahoo.com were used, and the submission process was through email.
9. Details of the editorial board members were either not given or were very limited.
10. Most of the journals used author certificates, book or thesis publication as a tactic to attract researchers.
11. Unsolicited and usually bulk spam emails were received from different accounts for a single journal. For example, currentjournalcr6@yahoo.com and currentjournalcr9@yahoo.com for International Journal of Current Research (IJCR).
12. Journals resembled each other in terms of their webpage or content (normally copy-pasted with many mistakes).
13. All journals and publishers were present in Beall's list of predatory journals or publishers. Although these lists have been taken down, archived copies are still accessible at https://web.archive.org/web/20170111172309/https://scholarlyoa.com/individual-journals/ (Memon 2017a). Beall however, recently disclosed institutional political and economic pressure as the reason for the shutdown of his blog (Beall 2017b), although this was denied by his own university (Elmes 2017).
14. All of the journals detected were predatory based on a predatory rate >0.22.

Suggestions for the Scientific Community

Publication counting is an obsolete concept, and academic reputation is currently built mostly on what is published and in which journal, not on the number of articles published (Clark and Thompson 2016). It is important for young researchers and mentors, particularly in developing countries, to understand this. To avoid being victimized by questionable journals, authors can try some of the available resources for journal selection (Table 2). Authors should also look for indexing in legitimate databases such as PubMed and DOAJ. Moreover, GoogleScholar or ResearchGate (the most popular academic social networking site) should not be criteria for quality assessment, as they provide access to all publications without screening for quality (Masten and Ashcraft 2016; Memon 2016). If accessible, legitimate databases such as Scopus®, Journal of Citation Reports®, Web of Science™, SciELO* Citation Index, or the new CiteScore may also be considered if doubts remain about a journal's quality even after checking the other options mentioned above. Here, it is

Table 2 Some useful resources for journal selection

Resource[a]	Website
Beall's list of predatory publishers 2017	https://scholarlyoa.com/2017/01/03/bealls-list-of-predatory-publishers-2017/ (the link is defunct now but archived copies may be accessible)
Think check submit campaign	http://thinkchecksubmit.org/
Alexa database	http://www.alexa.com/topsites/category/Science/Publications/Journals
Journal selectors	
a. Edanz journal selector	https://www.edanzediting.com/journal-selector
b. Elsevier journal finder	http://journalfinder.elsevier.com/
c. Springer journal suggester	http://journalsuggester.springer.com/
d. JANE-journal author name estimator	http://jane.biosemantics.org/
e. Journal guide by research square	https://www.journalguide.com/
Products from clarivate analytics (formerly Thomson Reuters)	
Journal citation reports®	http://wokinfo.com/products_tools/analytical/jcr/
EndNote™ journal matching	http://endnote.com/product-details/manuscript-matcher
Master journal list	http://ip-science.thomsonreuters.com/mjl/
Elsevier's cite score	https://journalmetrics.scopus.com/

[a] Note that these resources are not exhaustive. Author should try to use their judgement in selecting the best possible journals for publishing their work. In case of any suspicion or doubt, the journal should be avoided

important to mention that there are always gray areas in research and these databases are also prone to error and criticism. For example, DOAJ, PubMed, and some of the Thomson Reuters databases have been criticized for including potential or possible predatory journals (African Journal of Business Management, African Journal of Biotechnology, and African Journal of Agricultural Research, for instance), although they are immediately removed as soon as they are detected (Beall 2015, 2016a; Clark and Smith 2015; Memon 2016; Petrişor 2016).

Mentors and supervisors should be familiar with the phenomenon of fraudulent journals and be able to avoid them. Beall's list of predatory journals and publishers (including hijacked journals) (Beall 2017a), the list of hijacked journals developed by Dadkhah and colleagues (Dadkhah et al. 2016) and guidelines by organizations such as COPE, the World Association of Medical Editors (WAME), Open Access Scholarly Publishers Association (OASPA) (Committee on Publication Ethics et al. 2015; Winker 2016), ICMJE (International Committee of Medical Journal Editors 2016) and others may be readily accessible and available at the institutional library, research department or through supervisors. Unlike higher income countries, librarians in developing countries may not have sufficient training and knowledge to help researchers identify and avoid questionable journals. Therefore, it becomes the responsibility of supervisors and mentors to help their students and young researchers avoid the academic racketeering of predatory journals.

In low and middle income countries, research and academic institutions must strive to improve training and mentorship, and make efforts to optimize publication literacy, particularly among naive researchers (Clark and Smith 2015; Memon 2017b). This would not only improve the integrity and reputation of such institutions, but would also help researchers focus on quality improvement and avoid predatory journals.

Regulatory authorities in developing countries should be clear in their policies for authors and editors, and should focus more on quality than mere quantity, which subsequently results in futile outcomes, i.e. publications in predatory and questionable journals (Dhulkhed et al. 2016; Jawad 2017). A problem that needs consideration here and must not be overlooked is that journals produced in these countries, unlike journals from high income countries, may differ in their appearance, but that does not make them predatory (Winker 2016). Although they may not necessarily be predatory, they may be involved in predatory practices which should be avoided (Memon and Waqas 2017). Regulatory authorities in developing countries should try to evaluate journals based on guidelines from scholarly organizations and associations, and may also consider using the predatory rate to check the position of their journal (Memon 2017b). In this context, WAME recently published its criteria for identifying predatory or pseudo-journals, which may be of help (Laine and Winker 2017). Journal editors from lower or middle income countries would be well advised to follow the ethical guidelines suggested by the organizations noted earlier, and should not display any fake or misleading information (Memon 2016, 2017b, c). Also, journal editors from developing countries should be encouraged to keep publishing articles about research integrity and to stress the importance of educating their readership about predatory journals, give space for the relatively limited contribution thus far from authors and editors in developing countries to debates on this issue (Memon 2017b, c).

Above all, reputable journals and publishers should join the debate and play their role. All journals should publish something on the problem (Clark and Smith 2015). As noted in the Sarajevo Declaration on Integrity and Visibility of Scholarly Publications, "authors, reviewers, and editorial board members can increase visibility of their scholarly activities by registering with the Open Researcher and Contributor ID (ORCID) and providing information on their own authoring, reviewing, and publishing activities via their permanent accounts. Publishers of scholarly journals can maintain the integrity of pre- and post-publication communication by joining the ORCID global initiative" (Maaic et al. 2016). The Journal of Korean Medical Sciences (JKMS) (http://www.jkms.org/) is a good example: it has recently published special articles on research ethics and integrity (including predatory publishers), and journals published by its (Asian) publisher, the Korean Association of Medical Journal Editors (http://www.kamje.or.kr/intro.php?body=eng_index) require an ORCID account from each contributor, along with the raw data in some cases. Journal editors are also advised to avoid sending "Calls for papers" that appear dubious, as suggested in a recent article (Wahyudi 2017). They should carefully evaluate their journal's practices and avoid anything that may be dubious or may render them predatory (Memon and Waqas 2017). Finally, to avoid the impact factor numbers game, journals should either mention their impact factor in

the "instructions for authors" or "about the journal" section, or should simply adopt a metric-neutral approach as recently done by American Society of Microbiology journals (Casadevall et al. 2016). Moreover, legitimate journals and publishers are advised to follow practices that do not raise questions about them, as recently described (Memon and Waqas 2017; Beall 2016b; Bloudoff-Indelicato 2015).

Conclusion

This educational piece presents the main strategies used by predatory journals and publishers to victimize researchers. There is an immense need to educate young researchers and provide guidelines at all levels (especially for developing countries), so that this menace, if not stopped, can at least be minimized. The suggestions presented here may help young researchers to avoid questionable journals and select legitimate journals to submit and publish their research.

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Compliance with Ethical Standards

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