



# Awareness of predatory journals and open access among medical oncologists: results of an online survey

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## ABSTRACT

**Introduction** Predatory journals harm the integrity of science as principles of ‘good scientific practice’ are bypassed by omitting a proper peer-review process. Therefore, we aimed to explore the awareness of predatory journals among oncologists.

**Methods** An online survey among oncologists working in Germany or Austria of various professional surroundings was conducted between October 2018 and April 2019.

**Results** One hundred and eighty-eight participants (55 women (29.2%), 128 men (68.1%)) completed the questionnaire. 41 (21.8%) participants indicated to work in a hospital, 24 (12.8%) in private practice and 112 (59.6%) in a university hospital. 98.9% of participants indicated to actively read scientific articles and consider them in clinical decision-making (96.3%). 90.4% of participants indicated to have scientific experience by publishing papers in journals with peer-review system. The open-access system was known by 170 (90.4%), predatory journals by 131 (69.7%) and Beall’s list by 52 participants (27.7%). Predatory journals were more likely to be known by participants with a higher number of publications ( $p < 0.001$ ), with more high-impact publications ( $p = 0.005$ ) and with recent publications ( $p < 0.001$ ). Awareness of predatory journals did not correlate with gender ( $p = 0.515$ ) or translation of scientific literature into clinical practice ( $p = 0.543$ ).

**Conclusions** The problematic topic of ‘predatory journals’ is still unknown by a considerable amount of oncologist, although the survey was taken in a cohort of oncologists with scientific experience. Dedicated educational initiatives are needed to raise awareness of this problem and to aid in the identification of predatory journals for the scientific oncology community.

## INTRODUCTION

‘Predatory journals’ threaten the medical scientific integrity as bogus articles were shown to be accepted by journals without any properly conducted peer review.<sup>1</sup> The common practice of predatory journals is to offer a fast and easy publication opportunity. Financially, the publishing houses behind predatory journals profit from the high article-processing charges but on cost of not conducting a proper peer-review of submitted papers.<sup>2</sup> The term ‘Predatory

## Key questions

### What is already known about this subject?

► Predatory journals compromise the scientific integrity in oncology by omitting the proper peer-review system, aiming primarily on financial profit through the publication of a high number of papers with article processing charge. However, predatory journals and the publishing houses behind certainly try to hide their practices what challenges the identification and thereby avoidance of submitting scientific work.

### What does this study add?

► In this survey, we could demonstrate that over one-third of the participating scientist in Austria and Germany are not aware of the ‘predatory journal’ problem, although almost all participants indicated that they are actively read scientific articles. However, the participants were only infrequently aware of methods to identify ‘predatory journal’, for example, by using Beall’s list.

### How might this impact on clinical practice?

► The present survey highlights the need for more educational initiatives to inform scientists on the particular problem of ‘predatory journals’ and especially how to identify them and avoid the submission.

journal’ was accentuated by Jeffrey Beall—a librarian at the University of Colorado—since he founded a list of journals and publishers that are suspicious for being predatory.<sup>3</sup> However, Beall included almost exclusively open-access journals on his list. Open-access journals also charge their authors an article-processing charge in order to provide the content without boundaries to the scientific communities. Several new open-access journals were founded in the past few years and several established journals offer open-access opportunities to make research results more accessible to a broad audience.<sup>4,5</sup> Indeed, several public funders require the grantees to only publish in freely accessible journals.<sup>6</sup> However, the difference between open-access

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journals of high-quality and predatory journals consists in a properly conducted peer-review process including high and transparent publishing standards.<sup>7</sup> We sought to investigate the relationship of persons working in the field of oncology with scientific background and their knowledge on predatory publishing.

## MATERIALS AND METHODS

In this prospective, anonymised online survey oncologists working in Austria and Germany irrespective of their educational level were eligible to participate. The online survey was established with limesurvey (Hamburg, Germany) and the link was distributed via email within the network of the Austrian Association of Haematology and Oncology (550 members), the Working Group Medical Oncology within German Cancer Association (Arbeitsgemeinschaft Internistische Onkologie (AIO); 1300 members) and the German Society of Haematology and Oncology (DGHO; 3300). In this online survey, each questionnaire item had to be answered in order to proceed to the next question. The survey was online from 1 October 2018 to 30 April 2019. Responses were exported and analysed into/by SPSS V.25 (SPSS). The survey consisted of 19 main questions and 14 subquestions, which were only included if the appropriate main question was checked/answered. The full survey can be found in the online supplementary figure 1.

### Statistical analysis

Normal distribution of participants, age—the only continuous parameter—was analysed by Q-Q plots and Shapiro-Wilk Test and therefore reported as median and IQR; all other parameters were summarised as absolute and relative frequencies. All missing responses were excluded from subsequent statistical analyses.

Differences between participants with and without knowledge of predatory journals were assessed by Mann-Whitney U test (age and all ordinal parameters) or Fisher's exact test (all other nominal parameters). A two-sided alpha level below 0.05 was considered statistically significant. All statistical analyses were conducted with SPSS V.25 (SPSS).

## RESULTS

### General participation characteristics

Overall approximately 5150 members were contacted via email although several members of the AIO and the DGHO are overlapping. The questionnaire was filled out by 188 participants (men: n=128 (68.1%), women: n=55 (29.2%), unknown (participants had the choice not to state their gender) n=5). Therefore, approximately 4% of members responded to the questionnaire. A total of 112 (59.6%) of 188 participants worked in a university affiliated hospital (men: n=78 (60.9%); women: n=32 (58.2%)), followed by non-university-affiliated hospital (n=41 (21.8%); men: n=28 (21.9%); women: n=12 (21.8%)) and private practice (n=24 (12.8%); men: n=15

**Table 1** Demographic characteristics of the entire study cohort

<b>Age, years (median (IQR))</b>	<b>50 (16)</b>
<b>Sex, n (%)</b>	
Male	128 (68.1)
Female	55 (29.2)
Missing	5 (2.7)
<b>Working place, n (%)</b>	
Hospital	41 (21.8)
Private practice	24 (12.8)
University-affiliated hospital	112 (59.6)
Miscellaneous	11 (5.9)
<b>Highest education, n (%)</b>	
Resident	23 (12.2)
Specialist registrar	27 (14.4)
Consultant	41 (21.8)
Lecturer	22 (11.7)
Professor	66 (35.1)
Miscellaneous	9 (4.8)

(11.7%); women: n=8 (14.5%)). Detailed descriptive statistics can be found in [table 1](#).

### Scientific publishing and experience

A total of 186 (98.9%) participants regularly accessed scientific literature using PubMed/Medline (n=180, 96.8%), UpToDate (n=112, 60.2%), scientific online platforms (n=70, 37.6%), textbooks (n=66, 35.5%) and others. In addition, 181 (96.3%) participants stated that scientific literature influenced their therapeutic/diagnostic decision processes. A total of 170 (90.4%) participants stated that they actively contributed to science, and 149 (79.3%) stated to be currently scientifically active. One hundred and forty-three (76.1%) participants stated that peer review was the most important factor, followed by a high-impact factor (n=133, 70.7%) and good indexing (n=98, 52.1%) to consider a journal for publication. These three factors were also repeatedly mentioned when the reliability of an unknown scientific journal should be rated (see [table 2](#) for further details).

### Open-access publishing

The open-access system was known by 170 (90.4%) participants and 97 (57.1%) reported to have already published in an open-access journal. Reasons to publish in an open-access journal were (1) higher visibility of the published articles (n=117, 62.2%), (2) prestigious reputation of the respective journal (n=93, 49.5%) and (3) a fast publication process (n=61, 32.4%). 17.6% of the participants indicated to be willing to pay between €0 and €100 and 24% were willing to pay more than €1000 for publication in an open-access journal ([table 3](#)).

**Table 2** Answers of all participants on the topic of general scientific publishing

Do you read scientific literature (original articles, reviews, ...)? n, (%)	
Yes	186 (98.9)
No	2 (1.1)
If yes, which type of media do you use?*† yes, n (%) (n=186)	
PubMed/Medline	180 (96.8)
German institute for medical documentation and information	10 (5.4)
Journal-Newsfeed	38 (20.4)
OncLive	4 (2.2)
Scientific online platforms	70 (37.6)
Textbooks	66 (35.5)
UpToDate	112 (60.2)
If yes, do such articles influence your diagnostic/therapeutic decisions?*, n (%) (n=186)	
Yes	181 (96.3)
No	5 (2.7)
Do you have scientific experience?, n (%)	
Yes	170 (90.4)
No	18 (9.6)
If yes, in which form?*†, yes, n (%) (n=170)	
Writing of publications	169 (99.4)
Editor	38 (22.4)
Reviewer for one or more journals	125 (73.5)
How many publications did you author as first or last author?*, n (%) (n=169)	
<10 publications	55 (32.5)
10–100 publications	99 (58.6)
>100 publications	15 (8.9)
Did you publish any high-impact publications in your field?*, n (%) (n=169)	
Yes	114 (67.5)
No	55 (32.5)
How many publications did you co-author?*, n (%) (n=169)	
<10 publications	32 (18.9)
10–100 publications	101 (59.8)
>100 publications	36 (21.3)
Are you listed as Corresponding-Author in one of your publication?*, n (%) (n=169)	
Yes	132 (78.1)
No	37 (21.9)
If yes, how often?*, n (%) (n=132)	
1–10	54 (40.9)
11–20	20 (15.2)

Continued

**Table 2** Continued

21–50	39 (29.5)
>50	19 (14.4)
Are you scientifically active at the moment?, n (%)	
Yes	149 (79.3)
No	39 (20.7)
Which arguments are the most important for you if considering a specific journal for publication of your scientific work?†, yes, n (%)	
Press work	3 (1.6)
Rapid publication process	68 (36.2)
High-impact factor	133 (70.7)
Peer review	143 (76.1)
Prestigious Editorial Board	58 (30.9)
No publication costs	39 (20.7)
Good editorial support	33 (17.6)
Good indexing (PubMed, PMC, ...)	98 (52.1)
I don't publish anything	22 (11.7)
Which arguments would you include in the grading of the reliability of a specific scientific journal?†, yes, n (%)	
Indexing of the journal (Pubmed, Web of Science, ...)	129 (68.6)
Impact factor of the journal	154 (81.9)
Prominence of the editor in chief	51 (27.1)
Cooperation with international organisations/societies	72 (38.3)
Layout of the journal	8 (4.3)
Localisation of the editorial office	28 (14.9)
Publishing experiences of other colleagues	86 (45.7)
Publisher	33 (17.6)
Amount of publication costs	40 (21.3)
Further information on the peer-review process	76 (40.4)
Third party experience (eg, Blog entries/Google entries)	18 (9.6)
Quality of the submission system	21 (11.2)
Scope of the journal	45 (23.9)
Internet presence of the journal	39 (20.7)

Numbers in the table represent n (%). Missing values are not shown explicitly but are the difference to the given total number.

\*Follow-up question, total number of answers out of all possible answers are given in brackets. Missing values are not shown explicitly but are the difference to the given total number.

Percentages have been calculated from all valid given answers.

†Multiple answers possible.

### Awareness of journals with predatory peer review

A total of 131 participants (69.7%) in the survey had prior knowledge of predatory journals. The source of information was scientific literature (n=78, 59.5%),

**Table 3** Answers of all participants on the topic of open access publishing

Do you know the 'open-access' system?, n (%)	
Yes	170 (90.4)
No	18 (9.6)
If yes, did you publish anything in an open-access journal yet?*, n (%) (n=170)	
Yes	97 (57.1)
No	61 (35.8)
Don't publish anything	9 (5.3)
Don't know	3 (1.8)
Why would you publish your work in an open-access journal?†, n (%)	
High visibility	117 (62.2)
Promotion of the results over social media	9 (4.8)
Fast publication process	61 (32.4)
Prestigious journal	93 (49.5)
As opportunity to publish 'negative' results	51 (27.1)
Less strict peer-review process	4 (2.1)
Will not publish anything in an open-access journal	23 (12.2)
How much would you be willing to pay for a publication in an open access journal?, n (%)	
€0–€100	33 (17.6)
€101–€300	19 (10.1)
€301–€500	21 (11.2)
€501–€700	9 (4.8)
€701–€1000	18 (9.6)
€1001–€1500	24 (12.8)
€1501–€2000	15 (8.0)
€2001–€3000	3 (1.6)
€3001–€4000	3 (1.6)
> €4000	0 (0.0)
Did not plan to publish anything	35 (18.6)
Miscellaneous‡	8 (4.3)

Numbers in the table represent n (%). Missing values are not shown explicitly but are the difference to the given total number.

\*Follow-up question, total number of answers out of all possible answers are given in brackets. Missing values are not shown explicitly but are the difference to the given total number.

Percentages have been calculated from all valid given answers.

†Multiple answers possible.

‡no experience (1), nothing (3), ~€1000 (1), don't care (1), only free of charge (1), depends on the quantity and quality of the photo material. No hard and fast answer possible (1).

friends/colleagues (n=55, 42.0%), emails (n=59, 45.0%), congresses (n=34, 26.0%) and media (including social media) (n=75, 57.3%). A total of 103 (54.8%) participants indicated to know how to identify a predatory journal whereas 85 (45.2%) participants indicated to lack the ability of identifying a journal with predatory background. Characteristics of potential predatory journals

would be 'no or insufficient peer review' (n=155, 82.4%), 'low quality of the published articles' (n=134, 71.3%), 'no impact factor' (n=97, 51.6%) or 'no editorial board or no real persons on the editorial board' (n=93, 49.5%). In daily clinical practice, 139 (73.9%) participants stated that they have been challenged by patients with scientific literature/studies and 19 (13.7%) participants stated that such studies came from potentially predatory journals. Although the majority of participants answered that they knew how to identify potential predatory journals, only a minority (n=52, 27.7%) was familiar with Beall's list of potential predatory journals and publishers. Of these, a minority of only half (n=25, 48.1%) actively used Beall's list to identify potential predatory journals. With regard to solicited paper submissions by email campaigning, 142 (75.5%) participants had received 11–50 email invitations to publish per month (n=60, 42.3%). The majority of these emails came from potential predatory journals/publishers (n=110, 77.5%; table 4).

Knowledge of predatory journals was associated with educational level (p<0.001), academic working environment (p<0.001), scientific experience (p<0.001) and current scientific activity (p<0.001; table 5). Concerning the awareness of journals with predatory background, no difference in gender (p=0.515) was evident.

## DISCUSSION

The number of scientific medical journals increased markedly over the last decade and an increasing sector of journals provides open access to ensure a broader availability of scientific knowledge.<sup>8,9</sup> Predatory journals take advantage of the increasing pressure on medical scientists to publish, as the academic success is frequently and predominantly measured based on the published scientific papers.<sup>10</sup> The omitted peer-review process of predatory journals constitutes a severe hazard to the scientific integrity. Here, we tried to survey its potential impact on the field of oncology. The present survey showed that a considerable fraction of oncologists might still not be aware of predatory practices of some publishers. Therefore, a broader educational approach is needed to provide scientifically working and actively publishing oncologists with the essential knowledge to identify predatory journals. Here, social media as well as conference proceedings should address this problem as well as help in the identification of predatory journals to ensure an increase in awareness.

In line with previous publications from the field of dermatology, participants working at an university hospital or actively publishing scientific literature were more likely to be familiar with the open access system and predatory journals.<sup>11</sup> However, only the minority was aware of Beall's list indicating a lack in information on how to successfully identify journals with a predatory practice. Beall aimed to raise awareness for journals with a predatory publication system by providing criteria to identify predatory journals and distinguish them from

**Table 4** Answers of all participants on the topic of predatory publishing

Do you know the term ‘predatory journals’?, n (%)	
Yes	131 (69.7)
No	57 (30.3)
If yes, where from?†, n (%) (n=131)	
Scientific literature	78 (59.5)
Friends/colleagues	55 (42.0)
Emails	59 (45.0)
Congress	34 (26.0)
Media (including social media)	75 (57.3)
Do you know how to identify a potentially ‘Predatory Journal’?, n (%)	
Yes	103 (54.8)
No	85 (45.2)
How would you characterise a ‘Predatory Journal’?†, n (%)	
No impact factor	97 (51.6)
Open access to all articles	42 (22.3)
Low quality of the published articles	134 (71.3)
No or insufficient peer review	155 (82.4)
No editorial board or no real persons at the editorial board	93 (49.5)
Journal is located in a newly industrialising country	71 (37.8)
Unprofessional journal layout	62 (33.0)
High publication fees	91 (48.4)
Rapid publication process	63 (33.5)
Were you confronted with scientific literature/studies by patients?, n (%)	
Yes	139 (73.9)
No	49 (26.1)
If yes, were any of the articles published in a ‘Predatory Journals’?*, n (%) (n=139)	
Yes	19 (13.7)
No	71 (51.1)
Don’t know	49 (35.2)
Are you aware of the Beall’s List?, n (%)	
Yes	52 (27.7)
No	136 (72.3)
If yes, did you already actively use Beall’s list to see if an unknown journal is a ‘predatory’ journal?*, n (%) (n=52)	
Yes	25 (48.1)
No	27 (51.9)
Do you receive invitations by journals to contribute an article (Orig. Article, Review, Research Letter, ...)?, n (%)	
Yes	142 (75.5)

Continued

**Table 4** Continued

No	46 (24.5)
If yes, how many invitations do you receive each month?*, n (%) (n=142)	
1–10	40 (28.2)
11–50	60 (42.3)
51–100	32 (22.5)
>100	10 (7.0)
If yes, are any of these—as far as you aware of—from a ‘Predatory Journal’?*, n (%) (n=142)	
Yes	110 (77.5)
No	3 (2.1)
Don’t know	29 (20.4)

Numbers in the table represent n (%). Missing values are not shown explicitly but are the difference to the given total number. \*Follow-up question, total number of answers out of all possible answers are given in brackets. Missing values are not shown explicitly but are the difference to the given total number. Percentages have been calculated from all valid given answers. †Multiple answers possible.

legitimate, transparent scientific journals.<sup>3</sup> Several hints have been proposed by the literature and should be considered when approaching an unknown journal: (1) Peer review: Is the peer-review process clearly stated? (2) Emails: Is there any aggressive email policy in place to attract new submissions? (3) Advertising: Is a rapid peer-review process advertised or guaranteed? (4) Editorial Board: Does the editorial board reflect the scope of the journal? (5) Indexing: Since indexing provides some quality checks, is the journal indexed in several internationally known databases? (PubMed, MEDLINE, web of science, DOAJ, ...) (6) Published work: Is the published work—including layout and figures—of scientific quality/good copy-editing and free of spelling errors?<sup>7</sup> However, all these aspects should be respected together to get a bigger picture of a new journal when considering a specific journal.

Indeed, the majority of participants in the present study indicated ‘no or insufficient peer review’ as a major hallmark of predatory journals. Importantly, the peer-review process is the most important factor to ensure scientific integrity and cannot be assessed externally since the peer-review reports are not made public.<sup>12</sup> Only approximately half of the participants indicated a missing impact factor as a hallmark of a predatory journal. Moreover, indexing in PubMed was a major criterion in the present survey for scientists to choose a journal for publication of their scientific work. However, recent investigations underscored that many predatory journals are indeed indexed in PubMed.<sup>13</sup> However, the identification of a predatory journal especially for unexperienced scientists is challenging. In consequence, the scientific community recently initiated a discussion to increase the required prerequisites for a journal to be listed in PubMed.<sup>14</sup> The

**Table 5** Answers to selected questionnaire items divided by the knowledge of predatory journals by the participants

	Knowledge of predatory journals		P value
	No (n=57) (%)	Yes (n=131) (%)	
Gender (n=183)			
Male	38 (20.8)	90 (49.2)	0.515*
Female	19 (10.4)	36 (19.6)	
Highest education			
Resident	12 (6.4)	11 (5.9)	<0.001*
Specialist registrar	7 (3.7)	20 (10.6)	
Consultant	22 (11.7)	19 (10.1)	
Lecturer	3 (1.6)	19 (10.1)	
Professor	10 (5.3)	56 (29.8)	
Miscellaneous	3 (1.6)	6 (3.2)	
Working place			
Hospital	20 (10.6)	21 (11.2)	<0.001*
Private practice	16 (8.5)	8 (4.3)	
University-affiliated hospital	19 (10.1)	93 (49.5)	
Miscellaneous	2 (1.1)	9 (4.8)	
Do you read scientific literature (Original Articles, Reviews, ...)?			
Yes	56 (29.8)	130 (69.1)	0.516†
No	1 (0.5)	1 (0.5)	
Do you have scientific experience?			
Yes	43 (22.9)	127 (67.6)	<0.001†
No	14 (7.4)	4 (2.1)	
Are you scientifically active at the moment?			
Yes	30 (16.0)	119 (63.3)	<0.001*
No	27 (14.4)	12 (6.4)	
Did you publish any high impact publications in your field?			
Yes	21 (12.4)	93 (55.1)	0.005*
No	21 (12.4)	34 (20.1)	
How many publications did you author as first or last author? (n=169)			
<10 publications	24 (14.2)	31 (18.3)	<0.001*
10–100 publications	17 (10.1)	82 (48.5)	
>100 publications	1 (0.6)	14 (8.3)	
How many publications did you co-author? (n=169)			
<10 publications	18 (10.7)	14 (8.3)	<0.001*
10–100 publications	17 (10.1)	84 (49.7)	
>100 publications	7 (4.1)	29 (17.1)	
Are you listed as corresponding-author in one of your publication? (n=169)			
Yes	25 (14.8)	107 (63.3)	0.001*
No	17 (10.1)	20 (11.8)	
Do you know the 'Open Access' system?			
Yes	41 (21.8)	129 (68.6)	<0.001†
No	16 (8.5)	2 (1.1)	
Were you confronted with scientific literature/studies by patients?			
Yes	38 (20.2)	101 (53.7)	0.134*
No	19 (10.1)	30 (16.0)	

Continued

Table 5 Continued

	Knowledge of predatory journals		P value
	No (n=57) (%)	Yes (n=131) (%)	
Do you receive invitations by journals to contribute an article (Orig. Article, Review, Research Letter, ...)?			
Yes	28 (14.9)	114 (60.6)	<0.001*
No	29 (15.4)	17 (9.0)	
Do you know how to identify a potentially 'Predatory Journal'?			
Yes	5 (2.7)	98 (52.1)	<0.001†
No	52 (27.7)	33 (17.6)	
Are you aware of the Beall's List?			
Yes	3 (1.6)	49 (26.1)	<0.001†
No	54 (28.7)	82 (43.6)	

\*Pearson  $\chi^2$  test.

†Fisher's exact test.

results of the present survey highlight, that a broader education on how to identify predatory journals and proper resources and tools to facilitate this are urgently needed in the oncology scientific community, as there was no difference between the knowledge groups with regard to confrontation with scientific studies by patients.

Certainly, the present survey faces a geographical limitation as only medical oncologists from Germany and Austria were invited to participate. Further, considering the size of the addressed oncological community, the present survey had to face a rather low response rate. However, the participants responding to the survey were mainly from an academic background, in theory very much aware of the problem and pre-cautious of predatory journals. The survey did not apply formalised definitions of 'scientifically active' or 'high-impact journal' as we aimed to investigate how authors who would consider themselves as active scientist are aware of the challenges produced by predatory journals. Nevertheless, the present results report the first survey on publishing habits and the awareness of predatory journals in an oncology community and therefore add to the current awareness.

In conclusion, in the present survey among scientists in the field of medical oncology and haematology, the majority of participants was aware of the concept and potential negative impact of predatory journals on scientific publishing quality and integrity. However, identification of predatory journals and especially standardised approaches to classify predatory journals as such are only infrequently used and not well known, highlighting the need to provide more educational campaigns on the problems and challenges of predatory journals' practices in the field of oncology.

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