Special Report

The impact of the open-access status on journal indices: oncology journals

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Background: The field of oncology is among the highest productive fields in medicine, with the highest impact journals. The impact of open access (OA) journals is still understudied in the field of oncology. In this study, we aim to study the open-access status of oncology journals and the impact of the open-access status on journal indices.

Methods: We collected data on the included journals from Scopus Source List on 1st of November 2018. We filtered the list for oncology journals for the years from 2011 to 2017. OA journals covered by Scopus are indicated as OA if the journal is listed in the Directory of Open Access Journals (DOAJ) and/or the Directory of Open Access Scholarly Resources (ROAD).

Results: There were 318 oncology journals compared to 260 in 2011, an increase by about 24.2%, and the percentage of OA journals has increased from 19.6% to 23.9%. Although non-OA journals have significantly higher scholarly output (P=0.001), percent cited and source normalized impact per paper (SNIP) were higher for OA journals.

Conclusions: Publishing in oncology OA journals will yield more impact, in term of citations, and will reach boarder audience.

Keywords: Oncology; cancer; open access (OA); journals; bibliometry

Submitted Jan 15, 2019. Accepted for publication Feb 15, 2019.
doi: 10.21037/jgo.2019.02.13
View this article at: http://dx.doi.org/10.21037/jgo.2019.02.13

Introduction

It is almost a fact that number of publications in a field represents the main part of a research process, and when combined with the number of citations, it will represent the best indicator of the scientific performance (1). During the last decades, advancement of technology in recent years and the emergence of indexing services eased the way of measuring the productivity of a country, an institution, or a discipline, in terms of journal publications (2). Currently, the most commonly used literature databases are the Scopus and Web of Science for almost all disciplines (3). Scopus is the database that covers more journals than the other services (4).

Open access (OA) journals mean the removal of barriers (such as cost of subscription barriers)

from accessing scholarly work, where journals make published articles immediately freely available on their website, a model mostly funded by charges paid by the author (5). In the past years, the publishing of OA journals was extensively studied in many fields. Previous studies found that the OA proportion of increased from 27% in 2006 to 50% in 2010, and they found that open-access journals were the most common source of OA articles throughout this period (6,7). There is a clear evidence that publishing openly without cost for readers is associated with higher impact, through number of reads and citation rates (8,9).

The field of oncology is among the highest productive fields in medicine (10), and its journals being among the highest-impact in all journals (11). An example would be the *Ca-Cancer Journal*, the journal with the highest impact in all journals according to journal citation report (12). Another advantage for the field of oncology is the presence of major funding bodies that support its research (13), an advantage that allowed the emergence OA publishing to be easily accessible, through funding the cost of OA publishing. In this study, we aim to study the open-access status of oncology journals and the impact of the open-access status on journal indices. Moreover, we will assess the research output and journal metrics among oncology journals.

Methods

Data collection

We collected data on the included journals from Scopus Source List on 1st of November 2018. We filtered the list for oncology journals for the years from 2011 to 2017. OA journals covered by Scopus are indicated as OA if the journal is listed in the Directory of Open Access Journals (DOAJ) and/or the Directory of Open Access Scholarly Resources (ROAD).

Variables

For each journal, we extracted the following variables for the 2017 report:

- CiteScore: CiteScore measures average citations received per document published in the serial.
- CiteScore percentile: CiteScore percentile indicates the relative standing of a serial title in its subject field. For example, a serial that has a CiteScore percentile of 96% is ranked according to CiteScore as high or higher than 96% of titles in that category. A title will receive a CiteScore percentile for each subject area in which it's indexed in Scopus.
- Citation count: citations received in one year (e.g., 2017) for the documents published in the previous 3 years (e.g., 2014–2016).
- Scholarly output: sum of documents published in the serial title (e.g., 2017) in the 3 years prior to the year of the metric (e.g., 2014–2016).
- Percent cited: the proportion of the documents (e.g., 2014–2016) that have received at least 1 citation (e.g., 2017).
- SCImago journal rank (SJR): SJR measures weighted citations received by the serial. Citation weighting depends on subject field and prestige (SJR) of the citing serial.
- Source normalized impact per paper (SNIP): SNIP measures actual citations received relative to citations expected for the serial's subject field.
- SCImago quartiles: quartile 1 = 99th – 75th CiteScore percentile. Quartile 2 = 74th – 50th CiteScore percentile. Quartile 3 = 49th – 25th CiteScore percentile. Quartile 4 = 24th – 0 CiteScore percentile.

Statistical analysis

We used SPSS version 22.0 (Chicago, USA) in our analysis. We used mean (± standard deviation) to describe continuous variables (i.e., journal indices). We used count (frequency) to describe other nominal variables (i.e., publishers and OA journals). We performed Mann-Whitney to analyze the difference between measurements and OA status, and we presented data in median (25% to 75% quartiles). To analyze OA journals between oncology and medicine, we used weighting cases function in SPSS and we analyzed them using Chi-square test. All underlying assumptions were met, unless otherwise indicated. We adopted a P value of 0.05 as a significant threshold.

Results

According to the 2017 Scopus report, there were 318 oncology journals compared to 260 in 2011, an increase by about 24.2% (*Figure 1*). Springer Nature publishes 62 (19.5%), Elsevier publishes 58 (18.2%), Wiley-Blackwell publishes 17 (5.3%), Taylor & Francis publishes 16 (5.0%), and Wolters Kluwer publishes 15 (4.7%) journals. A total of 76 (23.9%) journals were OA journals. *Table 1* details

minimum, maximum, mean, and standard deviation of oncology journal indices.

Upon analyzing the difference between oncology OA and non-OA journals, we found significant differences in three main indices (*Figure 2*):

- Scholarly output (P=0.001): with a median of 176.5 (25–75%: 66.25–362.75) for OA, and a median of 285 (25–75%: 135–556) for non-OA journals.
- Percent cited (P=0.01): with a median of 73% (25–75%: 56–80.75%) for OA, and a median of 64% (25–75%: 30.5–78.25%) for non-OA journals.
- SNIP (P=0.037): with a median of 0.913 (25–75%: 0.618–1.255) for OA, and a median of 0.746 (25–75%: 0.260–1.116) for non-OA journals.

Upon comparing OA journals between the 5 most common publishers, we found a significant difference (P=0.05). *Post-hoc* analysis showed that Elsevier has significantly lower number of OA journals; 5 (8.6%) OA journals; compared to others. *Table 2* details OA status for most common publishers.

At the journal level, *Table 3* compares the five highest-ranked OA and non-OA journals according to SJR index. During the years from 2011 to 2017, the percentage of OA journals has increased from 19.6% to 23.9%. *Figure 3* shows the yearly percentage of OA journals.

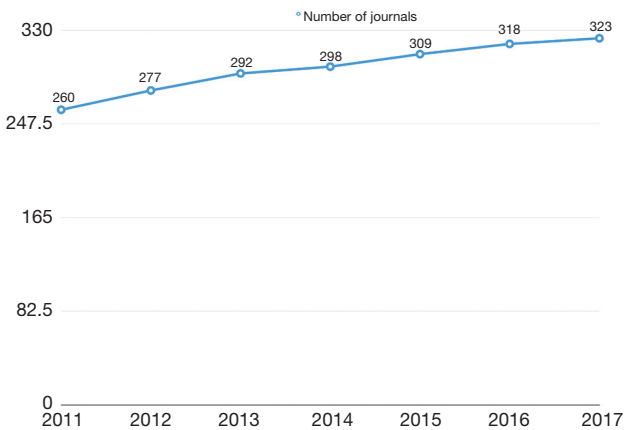

Figure 1 Number of oncology journals from 2011 to 2017.

Discussion

We observed an increase in number of oncology journals by about 24.2% between the years 2011 and 2017, which was also associated with an increase in the percentage of OA journals from 19.6% to 23.9%. Although the median number of scholarly output by non-OA oncology journals is significantly higher than OA oncology journals, both the SNIP and percentage of articles cited are significantly higher for OA journals.

The growth in the field of oncology is apparent through different indicators, one of which is the growth of number of journals, especially the OA journals, as found in our study. It is estimated that the world oncology publication output increases by an average of 4.9% per year (11). In general, the contribution of health science disciplines in the OA journals predominated throughout the previous years, with an average percentage of OA journals of about 11.4% in health sciences and 8.5% for all disciplines (14,15). The percentage of OA journals in oncology is higher than the average percentage for health science disciplines, with a clear increase in this percentage throughout the last few years. The higher percentage of OA journals in health sciences is mainly due to the presence of funding bodies and the regulations that mandate an OA publishing model (16), these reasons are more prominent in the field of oncology.

Table 1 Descriptive statistics for metrics for all oncology journals

Variable	N	Minimum	Maximum	Mean	Std. deviation
CiteScore	318	0	130	2.88	7.566
Percentile	318	1	99	49.64	28.787
Citation count	318	0	52,371	1,701.85	4,216.407
Scholarly output	318	4	11,270	483.27	851.295
Percent cited	318	0	98	57.03	27.863
SNIP	318	0.000	88.164	1.19129	4.990693
SJR	318	0.100	61.786	1.48207	3.961090
Rank	318	1.00	317.00	161.1226	92.77278

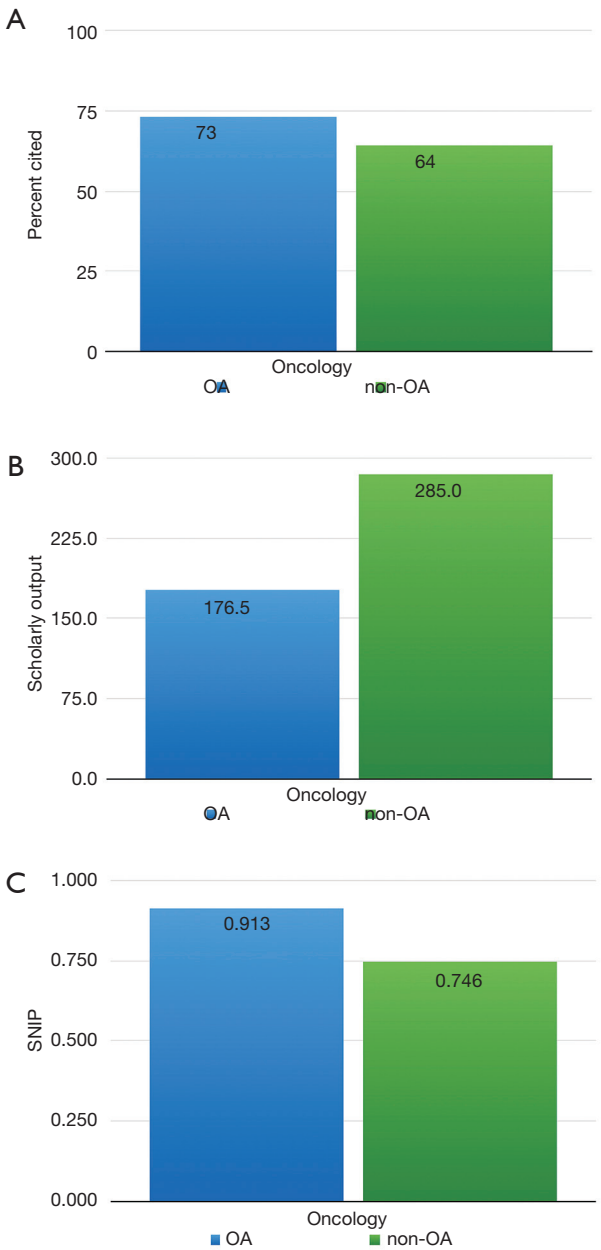

Figure 2 The difference in percent of articles cited (A), scholarly output (B), and source normalized impact per paper (SNIP) (C) between open access (OA) and non-OA oncology journals.

Hua *et al.* found that 58% of 912 journal articles published in 2014 that randomly sampled were freely accessed online in 2016 (17).

A study that analyzed the most-cited research papers in oncology revealed that the 5 journals that published most of these most-cited papers (around 47%) were non-OA

Table 2 Open access status for most common publishers

Publishers	Open access (%)		Total (%)
	No	Yes	
Others	109 (72.7)	41 (27.3)	150 (100.0)
Elsevier	45 (72.6)	17 (27.4)	62 (100.0)
Taylor & Francis	53 (91.4)	5 (8.6)	58 (100.0)
Others	14 (82.4)	3 (17.6)	17 (100.0)
Elsevier	10 (62.5)	6 (37.5)	16 (100.0)
Taylor & Francis	11 (73.3)	4 (26.7)	15 (100.0)
Total	242 (76.1)	76 (23.9)	318 (100.0)

journals (18). These findings are consistent with ours, as we found that the 5 highest rank journals in oncology were non-OA journals. On the other hand, we found that OA oncology journals have higher proportion of the documents that have received at least 1 citation (i.e., percent cited), and higher SNIP, a sophisticated metric that intrinsically accounts for field-specific differences in citation practices, compared to oncology non-OA journals. The exact effect of OA on citations in general is previously discussed, where several authors concluded that the relation of OA status of a journal and the citation it receives varies between disciplines (19), and that the effect of publishing as an OA in healthcare discipline resulted in more citations than other disciplines (16). A journal level analysis also revealed a strong association between downloads and citations for each journal, a relation that is expected to be more prominent in OA journals (20). Gargouri *et al.* study confirms the fact that OA independently and significantly correlate with increase in citations, even when we control the independent contributions of many other salient variables (article age, journal impact factor, number of authors, number of pages, number of references cited, Review, Science, USA author) (21). Schloegl and Gorraiz found a strong acceleration in the use and downloaded from oncology journals between 2001 and 2006, which is also correlated with an increase in citations for oncology journals (20). An analysis of the representation of oncology articles in general medical journals revealed a high representation in prestigious medical journals, with almost 25% of all publications in the 20 most prestigious medical journals were oncology publications, most of which were non-OA journals (22), which is also an indicator of fast paced development in oncology compared to other

Table 3 A comparison between the five highest-ranked OA and non-OA journals according to SJR index. Impact factors were taken from 2016–2017 journal citation report (JCR 2017)

OA status	Journals	Citation count	Scholarly output	Impact factor	Scopus coverage	Country
Non-OA	*Ca-A Cancer Journal for Clinicians*	16,961	130	244.59	1950	USA
	Nature Reviews Cancer	7,743	403	42.784	2001	UK
	The Lancet Oncology	18,794	1,815	36.42	2000	UK
	Cancer Cell	9,257	599	22.84	2002	USA
	Journal of Clinical Oncology	27,777	2,642	26.30	1983	USA
OA	*Breast Cancer Research*	2,848	486	6.14	1999	UK
	Journal for ImmunoTherapy of Cancer	1,281	219	8.37	2014	UK
	Molecular Cancer	4,074	566	7.78	2002	UK
	Blood Cancer Journal	1,240	334	8.13	2011	USA
	Journal of Hematology and Oncology	2,267	367	7.33	2008	UK

OA, open access; SJR, SCImago journal rank.

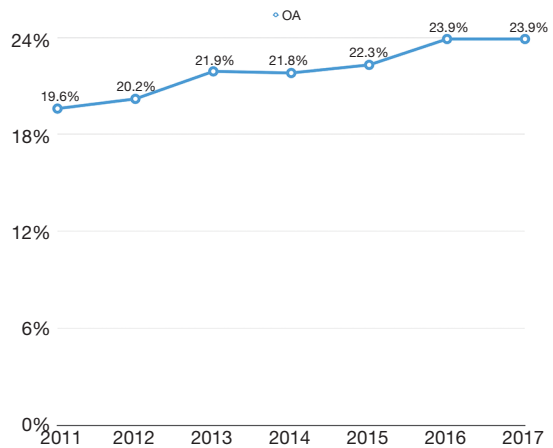

Figure 3 The percentage of open access (OA) oncology journals between 2011 and 2017.

specialties.

We believe this study has several limitations. The publishing model discussed here is the gold OA, where the journal makes the article openly available at its website, and the author has only the option of publishing in an OA model. The other form of publishing known as hybrid model, where journals provide the option for author to publish in either OA or not (23), was not discussed here.

Conclusions

We believe that the advancement of science is the responsibility of scientist who should publish their work as open as possible, however funding bodies should be encouraged to support the cost of OA publishing, and the publishers should lower the article processing charges to attract authors toward OA publishing. Elsevier as one of the major publishers should increase the number of its OA journals, especially in the field of oncology, as two of the top five non-OA journals (i.e., *The Lancet Oncology* and *Cancer Cell*) are Elsevier journals.

Acknowledgments

None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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Cite this article as: AlRyalat SA, Nassar AA, Tamimi F, Al-Fraihat E, Assaf L, Ghareeb R, Masoudi M, Al-Essa M. The impact of the open-access status on journal indices: oncology journals. J Gastrointest Oncol 2019;10(4):777-782. doi: 10.21037/jgo.2019.02.13

