Subscription-based and open access dermatology journals: the publication model dilemma

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Abstract

Medical journalism and the dissemination of peer-reviewed research serve to promote and protect the integrity of scholarship. We evaluated the publication models of dermatology journals to provide a snapshot of the current state of publishing. A total of 106 actively-publishing dermatology journals were identified using the SCImago Journal Rankings (SJR) citation database. Journals were classified by publication model (subscription-based and open-access), publishing company, publisher type (commercial, professional society, and university), MEDLINE-indexing status, and SJR indicator. Of these, 65 (61.32%) dermatology journals were subscription-based and 41 (38.68%) were open-access. In addition, 59 (55.66%) journals were indexed in MEDLINE and most were subscription-based (N=51) and published by commercial entities (N=54). MEDLINE-indexing status was significantly different across publisher types (P<0.001), access-types (P<0.001), and the top four publishers (P=0.016). Distribution of SJR indicator was significantly different across publisher types (P<0.001) and access-types (all journals, P=0.001; indexed journals only, P=0.046). More than 91% of MEDLINE-indexed titles were published by commercial entities, and among them, four companies controlled the vast majority. Discontinuation of access to any one of the top publishers in dermatology can significantly and disproportionately impact education and scholarship.

Keywords: dermatology, journals, open-access, publication model, subscription-based

Introduction

The dissemination of peer-reviewed research has played a role of paramount importance in contemporary society and throughout history. Medical journalism is one of the cornerstones of scientific advancement. However, an ongoing debate is whether there is a "superior" publication model. Subscription-based publishing was introduced in the 17th century to facilitate the systematic archiving of scientific findings [1]. A hallmark of the traditional model is the lack of publication fees for authors because the financial burden rests with those who wish to access the research (i.e., institutional licenses, individual journal subscriptions, or payment per article), [2]. Contrived from dissatisfaction with traditional publishing, the popularity of the open-access movement sprouted during the past two decades. This novel publishing model enables immediate online access of research at no cost to the reader—instead, the costs of publication and paywall-free access are paid by the author [3]. To keep up with the rising popularity of open-access, many traditional journals have adopted a hybrid model to present authors with the choice between open-access and subscription [4]. Nevertheless, hybrid journals are by convention still considered subscription-based as the bulk of their publications remain behind a paywall.

Subscription-based and open-access journals both have their merits and shortcomings in facilitating scientific communication. Throughout the years, subscription-based journals have been cemented as reliable sources of scientific knowledge. This reputation largely stems from the fact that editorial decisions in these journals are independent from financial considerations, which protects the integrity of the peer-review process [5]. The acceptance or rejection of a specific manuscript has no direct or immediate financial implications for subscription-based journals because they are funded by recurring subscriptions. On the other hand, fully open-access journals operate on publication fees paid by authors. Editorial decisions may not entirely be unrelated to financial considerations and it is up for discussion whether vigorous and stringent peer-review practices are upheld [5]. Nonetheless, the publication of scientifically-flawed papers have been well documented in both subscription-based and open-access journals [6,7].

Many researchers are privileged with extensive literature access provided by their academic institutions, but recent events have demonstrated that this should not be taken for granted. The fallout between Elsevier and the University of California over disagreements on pricing and open-access facilitation resulted in the temporary, complete suspension of Elsevier content for affiliates of the university [8]. The repercussions of such a development will be notable in the years to come considering the dominant presence of Elsevier within academia. Although the clash between University of California and Elsevier was the first to make major headlines, disputes over subscription-pricing and open-access support are not new to the academic community. Numerous publishers have reached their respective stalemates with academic institutions (e.g., MIT, the University of North Carolina Chapel Hill, among others) over pricing disagreements, which have ultimately led to subscription cancellations [9]. Publishing entities play a pivotal role in the dissemination of literature and the discontinuation of access for academic institutions can perpetually and disproportionately impact education and scholarship.

The publication models of dermatology journals have yet to be studied. Understanding the scope of influence of key publishers within medical journalism may benefit authors, readers, and institutions. Identifying the major stakeholders and examining the magnitude of their influence through market presence would allow for a projection of the repercussions should access to any one of the top publishers be discontinued. The purpose of this paper was to evaluate the publication models of dermatology journals and to provide a snapshot of the current state of publishing.

Methods

Statement of ethics

This study was exempt from Institutional Review Board approval as no human subjects were involved and the data was retrieved from a publicly available database containing information on peer-reviewed journals.

Data collection

SCImago Journal Rankings (SJR) by Scopus (Elsevier, Amsterdam, Netherlands) is a citation database containing more than 34,100 peer reviewed journals from over 5000 publishers [10]. This database was used to identify dermatology journals by searching the "Medicine" subject area and "Dermatology" subcategory. The data were extracted for the most recent year available, 2019. The downloaded spreadsheet included journal name, access-type (subscription-based or open-access), publisher name, and SJR indicator. The SJR indicator is derived from an iterative algorithm that takes into consideration the average number of weighted citations received per year divided by the total number of publications of a journal over the prior three years [11].

Each dermatology journal identified in the SJR database was systematically reviewed and manually assessed for inclusion suitability. Journals were excluded from analysis if they did not have an SJR indicator, had terminated publication, had an incorrect primary scope, or had a non-locatable website. A total of 106 journals were included for data analysis. Publishing entities were grouped as commercial, professional society, or university

publishers. Subsidiaries and imprints were grouped by their parent company (e.g., Elsevier BV, Elsevier USA, and Elsevier Espana were classified as "Elsevier"). Access-type data (subscription-based or open-access) were verified by individually visiting the website of each journal. MEDLINE indexing status was determined using the NLM Catalog (US National Library of Medicine, Bethesda, MD, USA). Data collection was completed in the second-half of 2020. This study was designed based on a previously validated methodology [12].

Data analysis

IBM SPSS Statistics version 25 (IBM Corporation, Armonk, NY, USA) was used to perform all analyses. Continuous data were reported as median, range, and mean with 95% confidence interval values. Categorical data were reported as an absolute numeric count with its corresponding percentage of the total. An alpha of 0.05 was used as the cut-off for significance. Fisher's exact test was performed to assess the distributions of access-type (subscription-based versus open-access) and MEDLINE indexing status (indexed versus not-indexed). Kruskal-Wallis test (one-way analysis of variance) was used to assess the distribution of SJR indicator across the top publishers, publisher types, and access-types. Traditional Analysis of Variance (ANOVA) was not used due to the lack of data normality.

Binomial logistic regression was performed to determine the effects of SJR indicator (continuous variable), access-type (subscription-based or open-access), publisher type (commercial or non-commercial), and publishing entity (top four publisher or other publisher) on the likelihood that journals were MEDLINE-indexed. Linearity of the continuous variable was assessed using the Box-Tidwell procedure with a Bonferroni correction (six terms in the model resulting in statistical significance when $P<0.008$). The continuous variable was found to be linearly related to the logit of the dependent variable. Presence of multicollinearity was assessed by a variance inflation factor greater than 5.00 and no multicollinearity was found. Three standardized residuals were identified as greater than 2.50 standard deviations but were kept in the analysis. All other assumptions were checked and satisfied.

Results

Publication model

By publisher type (commercial, professional society, and university)

This study included a total of 106 dermatology journals: 65 (61.32%) were subscription-based and 41 (38.68%) were open-access. **Figure 1** presents the distribution of subscription-based versus open-access journals in commercial, professional society, and university publishers. There was no significant difference in the distribution of subscription-based and open-access journals across the three types of publishers. (P=0.084).

By individual publishers

The top four publishers, all of which were commercial entities, collectively controlled 49.06% (52/106) of the dermatology publishing space. The distribution of subscription-based versus open-access journals across the top four publishers are illustrated in **Figure 2**. There was a significant difference in the distribution of subscription-based and open-access journals across the top four publishers (P=0.003).

MEDLINE indexing status

Of the 106 dermatology journals, 59 (55.66%) were indexed in MEDLINE. **Table 1** presents the number and percentage of MEDLINE-indexed journals by publisher type, access-type, and the top four publishers. There was a significant difference in the

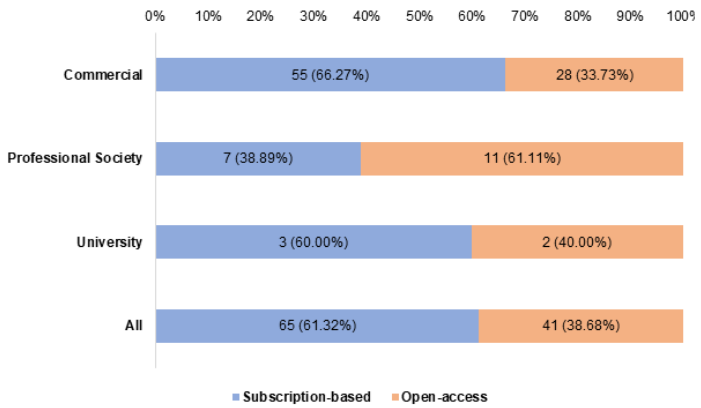

Figure 1. *Distributions of subscription-based versus open-access journals in commercial, professional society, university, and all publishers. The absolute number of journals and proportions are represented by the standalone numbers and the values in parentheses, respectively.*

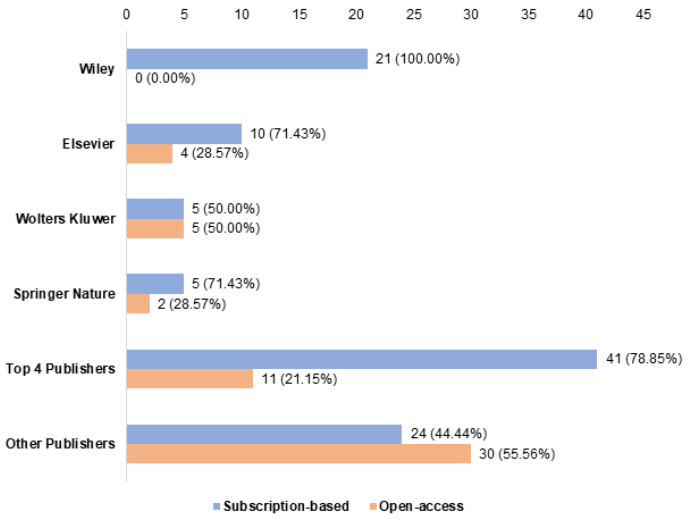

Figure 2. *Distributions of subscription-based and open-access journals by the top four publishers. The absolute number of journals and proportions are represented by the standalone numbers and the values in parentheses, respectively. The publishers are presented in descending order by total number of journals. Publishing entities representing four or fewer journals were designated as "other publishers".*

distribution of indexing status across the top publishers (P=0.016), publisher type (P<0.001), and access-type (P<0.001).

SCImago Journal Rank (SJR) indicator

The median, range, and mean SCImago Journal Rank (SJR) indicator of the top four publishers, different publisher types, and access-types are provided in **Table 2**. There was no significant difference in the distribution of SJR indicator across the top four publishers (P=0.261). There was a significant difference in the distribution of SJR indicator across publisher type (P<0.001) and access-type (all journals, P=0.001; indexed journals only, P=0.046).

Table 1. *The number and percent of MEDLINE-indexed journals in the top four publishers, different publisher types, and access-types. A P value less than 0.05 indicates a statistically significant difference in the distribution of MEDLINE-indexed journals.*

	Indexed (N)	Total (N)	Indexed (%)	P
Top Four Publishers				
Wiley	21	21	100.00	0.016
Elsevier	10	14	71.43	
Wolters Kluwer	7	10	70.00	
Springer Nature	5	7	71.43	
Publisher Type				
Commercial	54	83	65.06	<0.001
Professional society	3	18	16.67	
University	2	5	40.00	
Access Type				
Subscription	51	65	78.46	<0.001
Open	8	41	19.51	

Binomial logistic regression model

The logistic regression model was statistically significant ($\chi^2(4)=67.393$, P<0.001). The model explained 63.0% (Nagelkerke R^2) of the variance in MEDLINE-indexing status and correctly classified 83.0% of cases. Sensitivity was 81.4% and specificity was 85.1%. The positive and negative predictive values were 87.3% and 78.4%, respectively. The model is presented in **Table 3**.

Three predictor variables were statistically significant: SJR indicator (P=0.009), access-type (P<0.001), and publishing entity (P=0.019). Subscription-based journals had a 11.6 times higher odds of being MEDLINE-indexed than open-access counterparts. Journals by the top four publishers had 4.6 times higher odds of being MEDLINE-indexed than those from other publishers. Increasing SJR indicator was associated with an increased likelihood of being MEDLINE-indexed.

Discussion

Key patterns of journal publication models were described by systematically reviewing 106 dermatology journals identified in the SJR citations database. To our knowledge, our study was the first to analyze the publication models of dermatology journals. Nearly half of the dermatology publishing space was collectively controlled by four commercial entities, namely Wiley, Elsevier, Wolters Kluwer, and Springer Nature. To elucidate the altogether predominance of commercial publishers, less than one quarter of journals were published by non-commercial entities. In terms of publication model, there was no significant difference between the distribution of subscription-based and open-access journals across different publisher types (P=0.084). Furthermore, there lacked a clear consensus between the top four publishers (P=0.003) and it was evident that the receptiveness towards the fully open-access model varied on a publisher-by-

Table 2. *Comparison of mean, median, and range of SCImago Journal Rank Indicator (SJR Indicator). A P value less than 0.05 indicates a statistically significant difference in the distribution of SJR indicator.*

	Median	Range	Mean	95% CI	P
Top Four Publishers					
Wiley	641.00	455-2080	861.67	665-1058	0.261
Elsevier	711.00	107-1990	835.57	501-1170	
Wolters Kluwer	450.00	317-1351	594.90	362-828	
Springer Nature	764.00	218-1620	781.00	340-1222	
Publisher Type					
Commercial	583.00	102-2080	660.40	563-758	<0.001
Professional society	141.00	100-2025	279.39	57-501	
University	136.00	100-446	211.80	27-396	
Access Type					
Subscription (all)	622.00	136-2080	783.14	658-908	0.001
Open (all)	173.00	100-1324	312.68	231-395	
Subscription (indexed)	641.00	136-2080	827.35	689-966	0.046
Open (indexed)	461.50	180-1010	501.25	270-732	

publisher basis. For example, 100% (21/21) of the journals represented by Wiley were subscription-based and on the other end of the spectrum, Wolters Kluwer was 50% (5/10) subscription-based (**Figure 2**). Considering the sizable stake of the top four publishers in dermatology, these companies set the tone for the entire publishing space. As shown in **Figure 2**, only 11 of the 52 (21.15%) journals represented by the top four publishers were fully open-access. This was in stark contrast with the remaining publishers, among which 30 out of 54 (55.56%) journals were fully open-access.

Approximately two of every five dermatology titles were open-access, but our study suggested that subscription-based journals still had substantial leverage in dermatology. Comparing MEDLINE index status, 78.46% (51/65) of subscription-based journals compared to 19.51% (8/41) of open-access journals were MEDLINE-indexed, which represented a significant difference (P<0.001). Additionally, subscription-based journals had 11.6 times higher odds of being MEDLINE-indexed than open-access counterparts. MEDLINE indexing is a screening metric that ascertains the trustworthiness and quality of medical journals [13]. All MEDLINE-indexed titles have fulfilled a comprehensive content evaluation and satisfied a range of robust requirements [14]. Predatory practices and editorial mishandling are rarer occurrences within MEDLINE-indexed journal, and as such, research published within these titles are credible and reliable. Furthermore, these publications reach a wider audience through MeSH search term discovery [15]. The takeaway is that removing a paywall (i.e., publishing open-access) does not intrinsically enhance the visibility of an article. Just because something is free-to-read does not imply that it will be read and subsequently cited. However, if an

Table 3. *Binomial logistic regression. The dependent variable is MEDLINE-indexing status and the covariates are SJR indicator, access-type (subscription-based or open-access), publisher type (commercial or non-commercial), publishing entity (top four publisher or other publisher). The model estimates the impact of the primary predictors on being a MEDLINE-indexed dermatology journal.*

	Beta coefficient	Standard error	Wald	P	Odds ratio	95% CI for odds ratio	
						Lower	Upper
SJR Indicator	0.003	0.001	6.797	0.009	1.003	1.001	1.005
Access type [a]	2.452	0.601	16.620	0.000	11.608	3.572	37.729
Publisher type [b]	0.184	0.830	0.049	0.825	1.202	0.236	6.111
Publishing entity[c]	1.526	0.653	5.466	0.019	4.601	1.280	16.543
Constant	-3.454	0.795	18.856	0.000	0.032		

[a]Subscription-based compared to open-access (reference). [b]Commercial compared to non-commercial (reference). [c]Top four publishers compared to other publishers (reference).

article is published in a MEDLINE-indexed journal, even if subscription is required, the chances of someone feeling comfortable to cite the findings are arguably enhanced. This is the essence of the publication model dilemma. Researchers in the discipline of dermatology may be more inclined to select a subscription-based journal simply because there is greater availability and more selection among MEDLINE-indexed titles.

The distribution of MEDLINE-indexed journals across different types of publishers further demonstrated the predominance of commercial entities. Journals by the top four publishers had 4.6 times higher odds of being MEDLINE-indexed than those from other publishers. In addition, 91.53% (54/59) of all MEDLINE-indexed titles were represented by commercial publishers. Furthermore, journals by commercial publishers were 65.06% (54/83) MEDLINE-indexed, which represented a significant difference in the distribution of indexing status across commercial, professional society, and university publishers (P<0.001). It was interesting to note that the distributions of indexing status across the top four publishers were significantly different (P=0.016). The clear frontrunner, Wiley, boasted 100% (21/21) MEDLINE-indexing, whereas the remaining three publishers hovered around 70%. The top four publishers collectively represented 72.88% (43/59) of all MEDLINE-indexed titles, which may justify a tendency to submit to these journals. Consequently, as the highest quality dermatology research is funneled to the top four publishers, the dependence on subscriptions with Wiley, Elsevier, Wolters Kluwer, and Springer Nature is continually reinforced. Although the establishment of leading journals within a discipline is not innately bad, the discontinuation of access to the subscription-based content of any of these top publishers may paralyze the dissemination of scholarly literature and disproportionately impact education and scholarship.

SCImago Journal Rankings indicator is a measurement of journal prestige calculated from an iterative algorithm [11]. This metric can be consulted in conjunction with the indexing status to determine whether a journal is an adequate candidate for submission. Increasing SJR indicator was associated with an increased likelihood of being MEDLINE-indexed. Journals published by commercial entities had the highest median and mean SJR indicator out of the three publisher types. Among the top four publishers, Wiley journals had the highest mean SJR indicator; however, there was no significant difference in the distribution across the four publishers (P=0.261). The mean SJR indicator of open-access journals was significantly lower than subscription-based counterparts (P=0.001) and even after removing the non-MEDLINE-indexed journals from analysis, the difference remained significant (P=0.046). Journals with greater prestige were typically subscription-based and published by commercial entities.

This study had several limitations. First, the identification of dermatology journals for data collection and analysis was reliant on the SJR citation database, which has its share of limitations [16]. The aim of this study was to include dermatology journals from around the world, but certain journals may have been missed if they were not listed in the SJR database. Second, while there was no evidence to suggest a conflict of interest, the potential is present as the SJR database is run by Elsevier's Scopus. Third, journals were classified as either subscription-based or open-access, but not all journals fit perfectly into these binary categories. A journal was considered open-access if there was absolutely no access-paywall. As such, despite hybrid journals publishing open-access articles, they were considered subscription-based in this study as most of their publications were guarded by a paywall. Lastly, our study assumed the two major journal selection criteria to be MEDLINE-indexing and prestige, but there are other key considerations such as journal scope which were not accounted for.

Conclusion

The general characteristics outlined in this study provide a critical snapshot and appraisal of the dominance of key commercial publishers within dermatology. More than 91% of MEDLINE-indexed titles were published by commercial entities, and

among them, four companies controlled the vast majority. The moderate abundance of open-access journals casted an illusion of balance between subscription-based and open-access. However, more than three quarters of MEDLINE-indexed journals were subscription-based. Within their respective categories, subscription-based and commercial journals had the highest SJR indicator. When researchers evaluate prospective journals for submission, the eventual visibility and exposure of their articles are imperative. A heavily consolidated dermatology publishing space means that the discontinuation of access to any one of these top publishers can significantly and disproportionately impact education and scholarship.

Potential conflicts of interest

The authors declare no conflicts of interest.

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