Open Access and Article Processing Charges in Cardiology and Cardiac Surgery Journals: a Cross-Sectional Analysis

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Abstract

Introduction: Open access (OA) publishing often requires article processing charges (APCs). While OA provides opportunities for broader readership, authors able to afford APCs are more commonly associated with well-funded, high-income country institutions, skewing knowledge dissemination. Here, we evaluate publishing models, OA practices, and APCs in cardiology and cardiac surgery.

Methods: The InCites Journal Citation Reports 2019 directory by Clarivate Analytics was searched for “Cardiac and Cardiovascular Systems” journals. Sister journals of included journals were identified. All journals were categorized as predominantly cardiology or cardiac surgery. Publishing models, APCs, and APC waivers were defined for all journals.

Results: One hundred sixty-one journals were identified (139 cardiology, 22 cardiac surgery). APCs ranged from $244 to $5,000 ($244-5,000 cardiology; $383-3,300 cardiac surgery), with mean $2,911±891 and median $3,000 (interquartile range [IQR]: $2,500-3,425) across 139 journals with non-zero available APCs ($2,970±890, median $3,000, IQR: $2,573-3,450, cardiology; $2,491±799, median $2,740, IQR: $2,300-3,000, cardiac surgery). Average APCs were $3,307±566 and median $3,250 (IQR: $3,000-3,500) for hybrid journals ($3,344±583, median $3,260, IQR: $3,000-3,690, cardiology; $2,983±221, median $2,975, IQR: $2,780-3,149, cardiac surgery) and $1,997±832 and median $2,100 (IQR: $1,404-2,538) for fully OA journals ($2,039±843, median $2,100, IQR: $1,419-2,604, cardiology; $1,788±805, median $2,000, IQR: $1,475-2,345, cardiac surgery). Waivers were available for 51 (86.4%) fully OA and 37 (37.4%) hybrid journals. Seventeen journals were fully OA without APCs, one journal did not yet release APCs, and four journals were subscription-only.

Conclusion: OA publishing is common in cardiology and cardiac surgery with substantial APCs. Waivers remain limited, posing barriers for unfunded and lesser-funded researchers.

Keywords: Open Access Publishing. Access to Information. Publishing. Cardiac Surgical Procedures. Cardiology. Periodicals as Topic.

Abbreviations, acronyms & symbols

| Abbreviation | Description |
|--------------|-------------|
| APCs         | Article processing charges |
| BMC          | BioMed Central |
| EP Europace  | The European Journal of Pacing, Arrhythmias and Cardiac Electrophysiology |
| ESC          | European Society of Cardiology |
| IQR          | Interquartile range |
| JACC         | Journal of the American College of Cardiology |
| JAMA         | Journal of the American Medical Association |
| JCR          | Journal Citation Reports |
| JTCVS        | Journal of Thoracic and Cardiovascular Surgery |
| OA           | Open access |
| REC          | Revista Española de Cardiología |
| USD          | U.S. Dollar |

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INTRODUCTION

Scientific publishing is a multibillion-dollar industry, costing steep license fees for institutions to provide access to journals, high individual costs to subscribe to journals or buy articles, and little to no remuneration for reviewers’ time. Authors not associated with institutions covering full or partial access to major journals are forced to find alternate methods of accessing publications, such as pirating, especially if unable to afford fees to access articles[1]. Similarly, authors are frequently charged article processing charges (APCs) to publish “open access” (OA). This further impedes early-career researchers, researchers from lesser-funded institutions, and researchers from most low- and middle-income countries to publish articles[2]. In response to high publishing fees, predatory journals are increasingly pervading scientific practice[3]. Predatory journals promise quick and easy OA publishing for a fee, typically at only a fraction of non-predatory journals, resulting in millions of dollars generated by these journals, even during the coronavirus disease 2019 (or COVID-19) pandemic[4].

Despite the growing OA discourse, little is known regarding the most common subscription models and APCs. This study evaluates publishing models, OA practices, and APC amounts in cardiology and cardiac surgery journals.

METHODS

The InCites Journal Citation Reports (JCR) directory by Clarivate Analytics was searched to identify journals categorized as “Cardiac and Cardiovascular Systems” for 2019. Sister journals of included journals, defined as journals published by the same publisher and associated with the included journal, were further included. Journals were manually distinguished as being predominantly related to cardiology or to cardiac surgery based on their titles and, where applicable, associated professional societies. Publishing models (OA only, subscription only, or hybrid) and APCs, if applicable, were defined for all journals. OA only was defined as journals making all articles publicly available to readers, subscription only as journals making articles only available to readers with a (personal or institutional) subscription, and hybrid as a combination thereof. APCs were presented as mean±standard deviation and median with interquartile ranges (IQR). For journals with APCs, the availability of partial or full waivers as presented on the journal’s or publisher’s website was recorded.

RESULTS

In 2019, 137 non-duplicate journals were identified in the JCR Cardiac and Cardiovascular Systems category. Twenty-four journals were identified as sister journals of JCR-indexed journals for a total of 161 journals. One hundred thirty-nine journals were categorized as predominantly cardiology, of which 88 were hybrid, 49 fully OA, and two subscription. Twenty-two journals were categorized as predominantly cardiac surgery, of which 10 were hybrid, 10 fully OA, and two subscription.

APCs ranged from $244 to $5,000 ($244–5,000 cardiology; $383–3,300 cardiac surgery), with an average of $2,911±891 and median of $3,000 (IQR: $2,500–3,425) across 139 journals with non-zero and available APCs ($2,970±890, median $3,000, IQR: $2,573–3,450, cardiology; $2,491±799, median $2,740, IQR: $2,300–3,000, cardiac surgery). Average APCs were $3,307±566 and median $3,250 (IQR: $3,000–3,500) for hybrid journals ($3,344±583, median $3,260, IQR: $3,000–3,690, cardiology; $2,983±221, median $2,975, IQR: $2,780–3,149, cardiac surgery) and $1,997±832 and median $2,100 (IQR: $1,404–2,538) for fully OA journals ($2,039±843, median $2,100, IQR: $1,419–2,604, cardiology; $1,788±805, median $2,000, IQR: $1,475–2,345, cardiac surgery). Waivers were available for 51 (86.4%) fully OA journals, of which 16 (14 cardiology; two cardiac surgery) automatically applied waivers for authors from eligible low- and middle-income countries. Waivers were available for 37 (37.4%) hybrid journals, none of which were automatically applied. Seventeen journals (14 cardiology; three cardiac surgery) were fully OA and did not charge APCs. Supplemental Tables 1 and 2 present findings for cardiology and cardiac surgery journals. All values are presented in U.S. Dollars.

DISCUSSION

OA publishing is widely available as hybrid or fully OA journals in cardiology and cardiac surgery, yet APCs vary from $244 to $5,000 per article. APC waivers were available for authors from eligible low- and middle-income countries, either automatically applied or on a case-by-case basis. Few journals considered financial need among authors from high-income countries, presumably with the assumption that authors would be able to find the means to cover the costs. Our findings suggest that, while the academic shift to OA is clearly visible[5], enormous financial barriers on non-funded authors remain in the pursuit of OA publishing regardless of home country or institution. Although research on OA and APCs remains limited, lower average APCs were found in ophthalmology, multiple sclerosis research, and global health[6–8].

While waivers were often considered by publishers, these were typically only considered when publishing in a fully OA journal. Most journals publishing as hybrid models did not have waiver availability, requiring authors to opt for subscription publication. Hybrid journals were on average $1,300 more expensive than fully OA journals, which is confirmed by previous findings from research spending by North American institutions[9]. As these journals make up a majority of journals, especially those with higher impact factor, few authors are able to seek OA publishing of their work without having research funding or going through tedious processes of obtaining one-off external funding. Furthermore, while a majority of publishers clearly listed APCs, some publishers did not make APCs publicly available, which may deter and even deceive authors. Moreover, amongst the available waivers and discount criteria, researchers from upper-middle-income countries find themselves in an “upper-middle-income trap”, as they are commonly not eligible for such discounts or waivers despite lower income and standards of living compared to high-income countries. For example, authors from Brazil would not be eligible for discounts or waivers amongst the majority of main publishers (and thus journals); yet, there is vast variation in institutional and personal funding availability, with most researchers being unable to bear APCs. Lastly, APC waivers were typically

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## Supplemental Table 1. Publishing models and article processing charges for cardiology journals indexed in InCites Journal Citation Reports.

| Journal Name                                           | Impact Factor | Publishing Model | Article Processing Charges (USD) | Waivers Available                |
|--------------------------------------------------------|---------------|------------------|----------------------------------|----------------------------------|
| Acta Cardiologica                                       | 1.208         | Hybrid           | 2,995                            | No                               |
| American Heart Journal                                 | 4.153         | Hybrid           | 3,250                            | Case by case (Research4Life)     |
| American Journal of Cardiology                         | 2.570         | Hybrid           | 2,960                            | Case by case (Research4Life)     |
| American Journal of Cardiovascular Drugs               | 2.674         | Hybrid           | 3,860                            | No                               |
| American Journal of Physiology: Heart and Circulatory Physiology | 3.864  | Hyperbolic       | 3,000                            | -                               |
| Anatolian Journal of Cardiology                        | 1.223         | Open Access      | Free                             | -                                |
| Annals of Noninvasive Electrocardiology                | 1.131         | Open Access      | 2,250                            | Yes, upon request                |
| Annals of Thoracic Medicine                            | 1.456         | Open Access      | Free                             | -                                |
| Archives of Cardiovascular Diseases                    | 2.434         | Hybrid           | 3,620                            | Case by case (Research4Life)     |
| Arquivos de Brasileiros de Cardiologia                 | 1.450         | Open Access      | Free                             | -                                |
| Atherosclerosis                                        | 3.919         | Hybrid           | 3,200                            | Case by case (Research4Life)     |
| Basic Research in Cardiology                           | 11.981        | Hybrid           | 4,390                            | No                               |
| BMC Cardiovascular Disorders                            | 2.078         | Open Access      | 2,380                            | Case by case                     |
| Canadian Journal of Cardiology                         | 5.234         | Hybrid           | 3,200                            | Case by case (Research4Life)     |
| Canadian Journal of Cardiology Open                    | -             | Open Access      | 2,100                            | Automatic (Research4Life)        |
| Cardiology                                             | 1.791         | Hybrid           | 3,530                            | No                               |
| Cardiology Clinics                                     | 1.811         | Hybrid           | 3,150                            | Case by case (Research4Life)     |
| Cardiology in Review                                   | 1.816         | Hybrid           | 2,400                            | No                               |
| Cardiology in the Young                                | 1.000         | Hybrid           | 3,160                            | No                               |
| Cardiology Journal                                     | 1.669         | Open Access      | 900                              | Case by case                     |
| Cardiology Research and Practice                       | 1.292         | Open Access      | 2,100                            | Automatic                       |
| Cardiorenal Medicine                                   | 1.754         | Open Access      | 2,580                            | Case by case                     |
| Cardiovascular and Interventional Radiology            | 2.034         | Hybrid           | 3,860                            | No                               |
| Cardiovascular Diabetology                             | 7.332         | Open Access      | 3,170                            | Case by case                     |
| Cardiovascular Diagnosis and Therapy                   | 2.615         | Open Access      | 1,390                            | Yes, upon request                |
| Cardiovascular Digital Health Journal                  | -             | Open Access      | 2,800                            | Automatic (Research4Life)        |
| Cardiovascular Drugs and Therapy                       | 4.069         | Hybrid           | 3,860                            | No                               |
| Cardiovascular Engineering and Technology              | 1.771         | Hybrid           | 3,260                            | No                               |
| Cardiovascular Journal of Africa                       | 0.897         | Open Access      | 461                              | No                               |
| Cardiovascular Pathology                               | 1.756         | Hybrid           | 3,000                            | Case by case (Research4Life)     |
| Cardiovascular Research                                | 8.168         | Hybrid           | 4,592                            | No                               |
| Cardiovascular Therapeutics                            | 2.538         | Open Access      | 2,100                            | Automatic                       |
| Cardiovascular Toxicology                              | 2.284         | Hybrid           | 3,860                            | No                               |
| Cardiovascular Ultrasound                              | 2.051         | Open Access      | 2,790                            | Case by case                     |
| Catheterization and Cardiovascular Interventions       | 2.044         | Hybrid           | 3,800                            | No                               |

Continue
| Journal Title                                      | Impact Factor | Access Model | APC (USD) | Open Access? |
|---------------------------------------------------|---------------|--------------|-----------|--------------|
| Circulation                                      | 23.603        | Hybrid       | 3,450     | No           |
| Circulation: Arrhythmia and Electrophysiology     | 4.393         | Hybrid       | 3,450     | No           |
| Circulation: Cardiovascular Imaging               | 5.691         | Hybrid       | 3,450     | No           |
| Circulation: Cardiovascular Interventions         | 5.493         | Hybrid       | 3,450     | No           |
| Circulation: Cardiovascular Quality & Outcomes    | 5.071         | Hybrid       | 3,450     | No           |
| Circulation: Genomic and Precision Medicine       | 4.534         | Hybrid       | 3,450     | No           |
| Circulation: Heart Failure                        | 6.033         | Hybrid       | 3,450     | No           |
| Circulation Research                             | 14.467        | Hybrid       | 3,450     | No           |
| Circulation Journal                              | 2.540         | Open Access  | 1,929     | No           |
| Clinical Cardiology                              | 2.248         | Open Access  | 2,475     | Yes, upon request |
| Clinical Research in Cardiology                  | 5.268         | Hybrid       | 3,760     | No           |
| Clinical Research in Cardiology Supplements      |               | Hybrid       | 2,760     | No           |
| Congenital Heart Disease                         | 1.663         | Open Access  | 1,200     | Case by case |
| Coronary Artery Disease                          | 1.335         | Hybrid       | 2,400     | No           |
| Current Cardiology Reports                       | 2.434         | Hybrid       | 3,860     | No           |
| Current Opinion in Cardiology                    | 2.149         | Hybrid       | 3,000     | No           |
| Current Problems in Cardiology                   | 2.966         | Hybrid       | 3,000     | Case by case (Research4Life) |
| e-Journal of Cardiology Practice                 |               | Open Access  | Free (invited submissions only) | - |
| Echocardiography                                 | 1.393         | Hybrid       | 2,700     | No           |
| ESC Heart Failure                                | 3.902         | Open Access  | 3,366     | Case by case (Research4Life) |
| EuroIntervention                                 | 3.993         | Open Access  | Free      | -            |
| EP Europace                                      | 4.045         | Hybrid       | 4,592     | No           |
| European Heart Journal                           | 22.673        | Hybrid       | 4,592     | No           |
| European Heart Journal: Acute Cardiovascular Care| 3.813         | Hybrid       | 3,300     | No           |
| European Heart Journal: Cardiovascular Imaging   | 4.841         | Hybrid       | 4,549     | No           |
| European Heart Journal: Cardiovascular Pharmacotherapy | 6.696    | Hybrid       | 3,830     | No           |
| European Heart Journal: Case Reports             |               | Open Access  | 726       | Yes, upon request |
| European Heart Journal: Digital Health           |               | Open Access  | 3,225     | Yes, upon request |
| European Heart Journal: Quality of Care and Clinical Outcomes |   | Hybrid       | 4,280     | No           |
| European Heart Journal Supplements               | 1.655         | Hybrid       | 4,592     | No           |
| European Journal of Cardiovascular Nursing       | 2.296         | Hybrid       | 3,300     | No           |
| European Journal of Heart Failure                | 11.627        | Hybrid       | 4,300     | No           |
| European Journal of Preventive Cardiology        | 5.864         | Hybrid       | 3,300     | No           |
| Frontiers in Cardiovascular Medicine             | 3.915         | Open Access  | 2,490     | Case by case |
| Journal Name                                                      | Impact Factor | Access Type     | APC (€)      | Discount Method                                      |
|------------------------------------------------------------------|---------------|-----------------|--------------|-----------------------------------------------------|
| Global Heart                                                     | 3.862         | Open Access     | 1,583        | Automatic discount                                  |
| Heart                                                            | 5.213         | Hybrid          | 3,100        | No                                                  |
| Heart and Vessels                                                | 1.618         | Hybrid          | 3,260        | No                                                  |
| Heart Failure Clinics                                            | 2.327         | Hybrid          | 2,680        | Case by case (Research4Life)                        |
| Heart Failure Reviews                                            | 3.538         | Hybrid          | 3,860        | No                                                  |
| Heart & Lung                                                     | 1.630         | Hybrid          | 2,860        | Case by case (Research4Life)                        |
| Heart, Lung and Circulation                                     | 2.194         | Hybrid          | 2,500        | Case by case (Research4Life)                        |
| Heart Rhythm                                                     | 5.731         | Hybrid          | 3,500        | Case by case (Research4Life)                        |
| Heart Rhythm: Case Reports                                       | -             | Open Access     | 1,050        | Automatic (Research4Life)                           |
| Heart Rhythm O²                                                  | -             | Open Access     | 2,150        | Automatic (Research4Life)                           |
| Hellenic Journal of Cardiology                                   | 4.047         | Open Access     | Free         | -                                                   |
| Herz                                                             | 1.033         | Hybrid          | 2,760        | No                                                  |
| International Heart Journal                                      | 1.906         | Open Access     | 1,447        | No                                                  |
| International Journal of Cardiology                             | 3.229         | Hybrid          | 3,470        | Case by case (Research4Life)                        |
| International Journal of Cardiology: Congenital Heart Disease    | -             | Open Access     | 2,000        | Automatic (Research4Life)                           |
| International Journal of Cardiology: Heart and Vasculature       | -             | Open Access     | 2,550        | Automatic (Research4Life)                           |
| International Journal of Cardiovascular Imaging                  | 1.969         | Hybrid          | 3,260        | No                                                  |
| JAMA Cardiology                                                  | 12.794        | Hybrid          | 5,000        | No                                                  |
| Journal of Cardiology                                            | 2.246         | Hybrid          | 3,000        | Case by case (Research4Life)                        |
| Journal of Cardiopulmonary Rehabilitation and Prevention         | 1.383         | Hybrid          | 3,375        | No                                                  |
| Journal of Cardiovascular Computed Tomography                    | 2.892         | Hybrid          | 3,150        | Case by case (Research4Life)                        |
| Journal of Cardiovascular Electrophysiology                      | 2.424         | Hybrid          | 3,900        | No                                                  |
| Journal of Cardiovascular Magnetic Resonance                     | 5.361         | Open Access     | 2,680        | Case by case                                        |
| Journal of Cardiovascular Medicine                               | 1.225         | Hybrid          | 2,800        | No                                                  |
| Journal of Cardiovascular Nursing                                | 1.675         | Hybrid          | 2,570        | No                                                  |
| Journal of Cardiovascular Pharmacology                           | 2.598         | Hybrid          | 3,150        | No                                                  |
| Journal of Cardiovascular Pharmacology and Therapeutics          | 2.322         | Hybrid          | 3,000        | No                                                  |
| Journal of Cardiovascular Translational Research                | 3.312         | Hybrid          | 3,860        | No                                                  |
| Journal of Electrocardiology                                     | 0.944         | Hybrid          | 2,830        | Case by case (Research4Life)                        |
| Journal of Geriatric Cardiology                                  | 2.491         | Open Access     | Free         | -                                                   |
| Journal of Interventional Cardiac Electrophysiology              | 1.277         | Hybrid          | 3,260        | No                                                  |
| Journal of Interventional Cardiology                            | 1.758         | Open Access     | 2,100        | Automatic                                           |
| Journal of Invasive Cardiology                                  | 1.470         | Open Access     | Free         | -                                                   |
| Journal of Molecular and Cellular Cardiology                     | 4.133         | Hybrid          | 3,320        | Case by case (Research4Life)                        |

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| Journal                                      | Impact Factor | Model                  | APC/s od Pay-Per-View (Case by case) | Research4Life Case by case |
|----------------------------------------------|---------------|------------------------|--------------------------------------|---------------------------|
| Journal of Nuclear Cardiology                | 3.366         | Hybrid                 | 3,860                                | No                        |
| Journal of the American Heart Association    | 4.605         | Open Access            | 2,750                                | Automatic                 |
| Journal of the American College of Cardiology (JACC) | 20.589      | Hybrid                 | 3,000                                | Case by case (Research4Life) |
| JACC: Basic to Translational Science         | -             | Open Access            | 3,400                                | Automatic (Research4Life)  |
| JACC: CardioOncology                         | -             | Open Access            | 2,500                                | Automatic (Research4Life)  |
| JACC: Cardiovascular Imaging                 | 12.740        | Hybrid                 | 3,000                                | Case by case (Research4Life) |
| JACC: Cardiovascular Interventions           | 8.432         | Hybrid                 | 3,000                                | Case by case (Research4Life) |
| JACC: Case Reports                           | -             | Open Access            | 600                                  | Automatic (Research4Life)  |
| JACC: Clinical Electrophysiology             | -             | Hybrid                 | 3,000                                | Case by case (Research4Life) |
| JACC Heart Failure                           | 9.140         | Hybrid                 | 2,500                                | Case by case (Research4Life) |
| Journal of Cardiac Failure                   | 3.623         | Hybrid                 | 3,040                                | Case by case (Research4Life) |
| Journal of the American Society of Echocardiography | 5.508      | Hybrid                 | 3,000                                | Case by case (Research4Life) |
| Journal of Thrombosis and Thrombolysis       | 2.054         | Hybrid                 | 3,860                                | No                        |
| Kardiologia Polska                           | 1.874         | Open Access            | Free                                 | -                         |
| Kardiologiya                                 | 0.264         | Subscription           | -                                    | -                         |
| Korean Circulation Journal                   | 2.322         | Open Access            | Free                                 | -                         |
| Minerva Cardioangiologica                    | 0.713         | Subscription           | -                                    | -                         |
| Nature Reviews Cardiology                    | 20.260        | Hybrid (as of 2021)    | Not yet available                    | No                        |
| Netherlands Heart Journal                    | 1.933         | Open Access            | Free                                 | -                         |
| Nutrition Metabolism and Cardiovascular Diseases | 3.700      | Hybrid                 | 3,000                                | Case by case (Research4Life) |
| Open Heart                                   | -             | Open Access            | 2,628                                | Case by case              |
| Pace-Pacing and Clinical Electrophysiology   | 1.303         | Hybrid                 | 3,200                                | No                        |
| Pediatric Cardiology                         | 1.564         | Hybrid                 | 3,260                                | No                        |
| Perfusion-United Kingdom                     | 1.234         | Hybrid                 | 3,000                                | No                        |
| Postepy w Kardiologii Interwencynej          | 1.347         | Open Access            | 244                                  | No                        |
| Progress in Cardiovascular Diseases          | 6.763         | Hybrid                 | 2,800                                | Case by case (Research4Life) |
| Pulmonary Circulation                        | 2.205         | Open Access            | 2,000                                | Case by case              |
| Respiratory Medicine                         | 3.095         | Hybrid                 | 3,500                                | Case by case (Research4Life) |
| Reviews in Cardiovascular Medicine           | 0.659         | Open Access            | 1,250                                | Case by case              |
| Revista Española de Cardiología (REC)         | 4.642         | Hybrid                 | 3,000                                | Case by case (Research4Life) |
| REC: CardioClinics                           | -             | Hybrid                 | 1,500                                | Case by case (Research4Life) |
| REC: Interventional Cardiology               | -             | Open Access            | Free                                 | -                         |
| Revista Portuguesa de Cardiologia            | 0.960         | Open Access            | Free                                 | -                         |
| Scandinavian Cardiovascular Journal           | 1.084         | Hybrid                 | 2,995                                | No                        |
| Texas Heart Institute Journal                 | 1.023         | Open Access            | Free                                 | -                         |
| Trends in Cardiovascular Medicine            | 4.755         | Hybrid                 | 3,300                                | Case by case (Research4Life) |

BMC=BioMed Central; EP Europace=The European Journal of Pacing, Arrhythmias and Cardiac Electrophysiology; ESC=European Society of Cardiology; JAMA=Journal of the American Medical Association; USD=U.S. Dollar
Supplemental Table 2. Publishing models and article processing charges for cardiac surgery journals indexed in InCites Journal Citation Reports.

| Journal Name | Impact Factor | Publishing Model | Article Processing Charges (USD) | Waivers Available |
|--------------|---------------|------------------|----------------------------------|-------------------|
| Annals of Cardiothoracic Surgery | 3.058 | Open access | 2,390 | No |
| Annals of Thoracic and Cardiovascular Surgery | 1.584 | Open access | 383 | No |
| Annals of Thoracic Surgery | 3.639 | Hybrid | 3,000 | Case by case (Research4Life) |
| Brazilian Journal of Cardiovascular Surgery | 1.053 | Open access | Free | - |
| European Journal for Cardio-Thoracic Surgery | 3.486 | Hybrid | 3,087 | No |
| General Thoracic and Cardiovascular Surgery | 1.088 | Hybrid | 3,260 | No |
| Heart Surgery Forum | 0.404 | Open Access | 950 | No |
| Interactive CardioVascular and Thoracic Surgery | 1.675 | Open Access | Free | - |
| Journal of Cardiac Surgery | 1.490 | Hybrid | 2,900 | No |
| Journal of Cardiothoracic and Vascular Anesthesia | 2.258 | Hybrid | 2,680 | Case by case (Research4Life) |
| Journal of Cardiothoracic Surgery | 1.506 | Open Access | 2,490 | Case by case |
| Journal of Cardiovascular Surgery | 1.415 | Subscription | - | - |
| Journal of Heart and Lung Transplantation | 7.865 | Hybrid | 3,300 | Case by case (Research4Life) |
| Journal of Thoracic and Cardiovascular Surgery (JTCVS) | 4.451 | Hybrid | 2,950 | Case by case (Research4Life) |
| JTCVS Open | - | Open Access | 2,000 | Automatic (Research4Life) |
| JTCVS Techniques | - | Open Access | 2,000 | Automatic (Research4Life) |
| Multimedia Manual of Cardio-Thoracic Surgery | - | Open Access | Free | - |
| Operative Techniques in Thoracic and Cardiovascular Surgery | - | Hybrid | 2,740 | Case by case (Research4Life) |
| Seminars in Thoracic and Cardiovascular Surgery | 2.133 | Hybrid | 2,740 | Case by case (Research4Life) |
| Seminars in Thoracic and Cardiovascular Surgery: Pediatric Cardiac Surgery Annual | - | Hybrid | 3,170 | Case by case (Research4Life) |
| Thoracic and Cardiovascular Surgeon | 1.209 | Subscription | - | - |
| Thoracic and Cardiovascular Surgeon Reports | - | Open Access | 2,300 | No |

USD=U.S. Dollar

defined on the basis of authors' affiliation, which may limit authors from low- and middle-income countries who have recently moved to or are studying or training in high-income countries, authors from lower socioeconomic status, or authors without research funding (e.g., non-doctoral graduate students, residents) whose institution is not based in eligible countries. Some journals offer minimal discounts (e.g., 10-15% discount) to partnering institutions, which may perpetuate barriers for those without funding and only skew the dissemination of research towards those with research funding. While some smaller journals are independently operating or associated with non-profit organizations or professional societies, most journal have contracts with large publishing entities that jointly comprise the billion-dollar academic publishing industry, wherein profit margins run up to 30%[2]. Few OA or hybrid journals had no APCs and were most commonly covering or based in Latin America, where free-of-charge OA journals are commonplace and supported by both professional society and governmental support, a model that may be extended elsewhere[3].
Publishing does not come without a cost, as journals and publishers must hire editorial staff, manage online platforms and servers, maintain publication relations, and ensure typesetting of accepted publications. Nevertheless, they equally rely on the voluntary time of reviewers and most editors, whereas societal, industry, and other partnerships typically result in substantial monetary and in-kind support for journals to cover large shares of the fixed costs. The true costs of publishing a single article remain unclear, but estimates have shown to be as low as US$300 per article, far lower than the requested APCs\(^{[11]}\). The commonly cited publish-or-perish mentality in academic medicine has led to an increase in the number of predatory journals, seeking to take advantage of vulnerable authors facing barriers to publishing in acknowledged journals or wanting to find a quick way to publish. Previously known cardiovascular journals have been bought to leverage a pre-existing reputation and attract clinicians and researchers, yet they only publish verbatim (i.e., not reviewing or editing submissions), generating tens up to hundreds of thousands of dollars per journal per year\(^{[12]}\). What is especially concerning is the potentially important knowledge remaining undetected and not disseminated as a result of such predatory journals. For example, the field of global cardiac surgery is nascent, and local studies reporting on cardiac surgery outcomes in low- and middle-income countries have been identified in predatory journals. Barriers for authors from these countries are upheld by high APCs (less able to publish in certain journals) and non-OA (less able to access articles), underscoring the need to change the academic publishing narrative.

Limitations

Several limitations are inherent to this analysis. We used JCR to identify established journals and their sister journals, but we are aware of a number of journals not listed on JCR that are legitimate (e.g., PubMed/MEDLINE indexing, societal affiliation). However, as the number of journals included on JCR is large, our analysis paints a representative picture. Moreover, various journals give discounts for society members or on a case-by-case basis, which may lead to a vast variety in the exact APCs to be paid for some authors. Lastly, we utilized the highest APCs per journal, which sometimes have a vast variety in the exact APCs to be paid for some authors. Lastly, we utilized the highest APCs per journal, which sometimes have lower APCs for article types other than original articles, such as case reports. However, as most original research is published as original articles, we believe this most accurately reflects the status of authors.

CONCLUSION

OA publishing is common across cardiology and cardiac surgery journals with substantial APCs. Fees are prohibitive for unfunded and lesser-funded researchers in the absence of broader waiver considerations.

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Authors’ roles & responsibilities

DV  Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; drafting the work or revising it critically for important intellectual content; final approval of the version to be published

JGYL  Drafting the work or revising it critically for important intellectual content; final approval of the version to be published

MPBOS  Drafting the work or revising it critically for important intellectual content; final approval of the version to be published

EWE  Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; drafting the work or revising it critically for important intellectual content; final approval of the version to be published

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