COVID-19 pandemic and its impact on peer review speed of anesthesiology journals: An observational study

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Abstract

Background and Aims: Publication of a scientific article in a reputed journal is an uphill task that demands a significant amount of time and effort from the author and editorial team. It is a matter of great enthusiasm for all prospective researchers to know whether this daily evolving publication load of articles during this pandemic had changed the journal’s inherent peer review or publication process. We aimed to compare the peer review speed of anesthesiology journal articles published during pandemic (2020) to the previous year and to analyze various factors affecting peer review speed.

Material and Methods: Overall, 16 anesthesiology journals indexed in MEDLINE database were retrospectively analyzed. A set of 24 articles published in 2019 of the included journals were selected from each journal for control and a set of 12 articles published between January to September 2020 was selected for comparison. Time taken for acceptance and publication from the time of submission was noted. Peer review timing was calculated and its relationship with h-index, continent of journal origin and article processing charges were evaluated.

Results: The median peer review time in 2019 and 2020 were 116 (108‑125) days and 79 (65‑105.5) days, respectively. There was a 31.8% decrease (P = 0.0021) in peer review time of all articles in 2020 compared to 2019. The median peer review timings of COVID‑19 articles were 35 (22‑42.5) days. A 55.6% decrease was noted in peer review time of COVID‑19 articles compared to non-COVID‑19 articles in 2020. There was a significant correlation between peer review time and h-index (r = 0.558, P = 0.024) and between journals from different continents (P = 0.56).

Conclusion: Anesthesiology journals managed to curtail their turnaround time for peer review during the pandemic compared to previous year. Journal with higher h-index had longer peer review time. The option for articles processing charge and continent of publishing journal had no impact on peer review speed.

Keywords: Anaesthesiology, COVID-19, h-index, peer review time

Introduction

The coronavirus disease (COVID-19) pandemic is a global health crisis of our time and is one of the most significant challenges humankind has faced since the Second World War. Its impact on the health care sector is unprecedented and enormous. Rapid publication is paramount for disseminating new knowledge, particularly during this fast-moving health crisis like the COVID-19 pandemic.[1] The scientific community is in a rigorous effort to make the best evidence...
of the disease patterns and its implications as the disease process unveils itself over time. Simultaneously, journals in most medical disciplines strive to publish articles about the pandemic on an unprecedented scale and scope than ever before.\cite{2,3} Still, the same cannot be said about the articles in other research areas.\cite{4,5} This pandemic has affected both the researchers and reviewers equally and especially those professionals actively engaged in COVID-19 care. Lockdown measures by various governments and agencies worldwide have affected research in other areas of the medical field. This could have led to reduced editorial pressure and the turnaround time for publication.

Publication of a scientific article in a reputed journal is an uphill task that demands a significant amount of time and effort from the author and editorial team. It is a matter of great enthusiasm for all prospective researchers to know whether this daily evolving publication load of articles during this pandemic had changed the journal’s inherent peer review or publication process, especially regarding the speed with which the review process and decision on acceptance and publication were accomplished. Hence, the present study aimed to determine the peer-review speed of journal articles in anesthesiology journals during the pandemic period (2020) in comparison to the previous year (2019) and to establish a correlation of various factors to peer review speed among anesthesiology journals.

**Methods**

This observational study was conducted for the anesthesiology journals published in the year 2019 and 2020. The study period was from July-October 2020. Time taken for peer review of the original articles was considered as the primary outcome measure. Anesthesiology journals indexed in MEDLINE database 2020 were recruited for the study. Journals publishing original articles in the field of anesthesiology (h-index ≥20) were included in the study. Journals with published content exclusively related to “pain” or “critical care,” journals publishing only review articles and case reports, and journal without data regarding the date of submission, acceptance were excluded from the study. Using this criterion, we had shortlisted 16 journals for inclusion in our analysis.

A set of 24 articles published in 2019 of the included journals were selected from each journal for control. The selection of the articles was based on the number of issues published in the year 2019. For example, two articles were selected from each issue from a journal with 12 issues per year, four articles in a journal with six issues per year, and six articles in a journal with four issues per year, and so on. If the journal published <24 original articles per year, then all the journal articles were included in the study. The first set of articles was selected from each issue to maintain uniformity. The date of submission, date of acceptance, date of publication was obtained from the selected articles and was entered into the data extraction sheet. The data on parameters such as the article processing charges (APC) were obtained from the journal website. The h-index of selected journals was obtained from SCIMAGO.\cite{6} A set of 12 articles published between January to September 2020 was selected from the same journal for comparison. If the journal had less than 12 articles, all articles were included. The peer-review time or acceptance time (SA) has been defined as the interval between submission dates to the date of acceptance. The publication time (SP) has been defined as the interval between dates of submission to the date of online publication. The journal’s country of origin was listed, and all the journals were categorized into four continents: Asia, Europe, North America, and South America.

**Statistical analysis**

Statistical analysis was performed using R version 3.6.1, a software for statistical computing and graphics (The R Foundation, Vienna, Austria). Categorical variables are expressed as frequency or percentages. The data were analyzed for normality by using the Shapiro–Wilks test. Numerical variables are expressed as median with interquartile range (IQR). The Mann–Whitney U test and Wilcoxon signed-rank test were performed to compare two independent and paired groups, respectively. Kruskal–Wallis test was used to compare more than two independent groups. Spearman’s correlation was used to analyze the correlation between numerical variables. A ‘P’ value of <0.05 was considered statistically significant.

**Results**

The flow diagram of the journals selected for the study and the factors analyzed were depicted in Figure 1. Sixteen journals were included for the final analysis. A total of 358 articles were selected from the year 2019, and 181 articles peer-reviewed between January and September were selected from the year 2020. The median peer review time for all articles in 2019 was 116 (108-125) days. The median peer review time in 2020 (during the pandemic period) for all articles was 79 (65-105.5) days. There was a 31.8% decrease in all articles’ peer review time during the pandemic period compared to 2019. This decrease was statistically significant ($P = 0.002$). Thirteen journals (81%) have reported a decrease in peer review time during the pandemic period compared to 2019, amongst which four journals (25%) had peer review time significantly less ($P < 0.05$). Out of the
181 original articles published in 2020, 12 (6.6%) articles were published on COVID-19. The median peer review timings of those articles were 35 (22-42.5) days. We found a 55.6% decrease in peer review time of COVID-19 articles compared to non-COVID articles during the pandemic period.

The median publication time for all journals in 2019 was 166 (131-197) days. The median publication time for all journals during the pandemic was 116 (102-133) days. There was a 30.1% decrease in publication time in 2020 compared to 2019. The median h-index of journals include for analysis was 39 (26-70). There was a significant correlation between peer review time and h-index ($r = 0.558$, $P = 0.024$). Figure 2 shows scatter plot depicting the relation between peer review time and h-index. Though the peer review time varies between different continents, as shown in boxplot [Figure 3], it was not statistically significant ($P = 0.056$). The median peer review time is longer in the journal with APC (89.5 days) than those without (76.5 days), but the difference was not statistically significant ($P = 0.75$). Table 1 depicts comparative Peer review time and its correlates among the indexed anesthesiology journals.

### Discussion

The scholarly article submitted to a journal must succeed through various time-consuming stages, including peer review and thorough editorial work before getting published. The delay in peer review and editorial process of scientific journals often hinders the timely dissemination of relevant information. It is indeed more expensive during the current pandemic era like COVID-19, where the rapid generation of evidence and its sharing comprise top priority. Since the declaration of the pandemic as a public health emergency of international concern by W. H. O, the journals in almost every medical discipline had witnessed an unprecedented surge in articles related to pandemic over the last nine months, often referred...
to as ‘infodemic’ by the experts, putting enormous pressure on the editorial and review team. The speculations are due to the credibility and quality of the information supplied to the journals that need thorough scrutiny and cutting-edge decisions from the editorial team. Although the turnaround time for peer review is often correlated with the journal efficiency with direct reflection of the editorial team’s strength and caliber and supportive network, it holds true for the current pandemic. Most journals strived to achieve a prompt response to this crucial need.

We found that thirteen out of the sixteen anesthesiology journals recorded a reduction in the peer review time during the pandemic period (2020) compared to the previous year, out of which four journals demonstrated a statistically significant decrease ($P < 0.05$). The peer-review time varied across the included journals and may depend on different factors of journal efficiency and timely support from the reviewers. The current study found that the median peer review time for anesthesiology journals was 116 days in 2019 and 79 days in 2020. The peer-review time varies substantially between journal to journal and across the various medical disciplines. The median peer review time takes around 100 days for most of the biomedical journals. Asaad M et al. reported the median peer review time of 4.6 months (IQR 3-6.8) among six plastic surgery journals during 2018. Whereas Head and Face Medicine journals had a mean peer review time of just 37.8 days, as reported in a one-year retrospective study by Stamm T et al. in 2007. Anesthesiology journals in the current study had comparable peer review time with ophthalmology and biomedical Indian journals that reported median peer review times of 133 days and 143.5 days, respectively, as reported by Chen et al. and Shah et al. in their earlier bibliometric studies. The time spend on peer review had a strong bearing on the publication speed of articles where the longer peer reviews considerably increase the turnaround time for publication.

Our study found a 31.8% decrease in all articles’ peer review time and a 69.8% decrease for COVID-19 articles in 2020 compared to 2019 among the anesthesiology journals. In all articles published in 2020, we found the COVID-19 articles had 55.69% less peer review time than non-COVID articles ($P < 0.05$). This could be attributed to comparatively fewer non-pandemic related research submission and the effect of lockdowns that could have eased the editorial team’s pressure and influenced faster peer review and processing. Furthermore, to support the need for rapid dissemination of information related to COVID-19. Notably, some journals had reformed their peer review guidelines to accelerate the publication speed and often invited expert prospective reviewers to strengthen their peer review speed during the pandemic times to circumvent the inherent publication delays. Our findings corroborate with Horbach SPJM that reported shortening of peer review time for journals during the pandemic. Unlike Horbach SPJM, we found the acceleration of peer review for both COVID-19 and non-COVID-19 articles in 2020 among anesthesiology journals, where later reported only COVID-19 articles had a reduction in peer review time. This difference may also be explained by the fact that our analysis included only original research articles, not like Horbach SPJM, that accounted for different article types, including letters to editors, commentaries, and review articles that typically undergo a different form review process than original articles.

Our analysis included the h-index of included journals, a widely used author, or journal metric to quantify scholarly articles’ collective impact in a journal. The anesthesia journals included in the study had a median h-index of 39 (26-70). Interestingly, we noted a significant correlation between
Our study found a median publication time of 166 days for the anesthesiology journals before the pandemic. It was comparable to the publication speed of journals in other disciplines. However, this turnaround time got shortened to 116 days during the pandemic. The findings were in line with the study by Palayew et al. that reported a shortening of turnaround time for publication in journals compared to the previous year. Furthermore, the current study finding of the shortening of submission to acceptance time also corroborates with a study by Horbach et al. that reported reduction in turnaround time for publication was mainly attributed to the decrease in the number of days for the peer review among journals during pandemic.

We noted a difference in the peer review speed across the anaesthesia journals published from various continents, namely Asia, Europe, North America, and South America. However, the correlation between peer review speed and the publishing journal’s continents was not statistically significant ($P = 0.056$). Many journals impose article processing charges (APC) to meet the expenses associated with the editorial process, review, and publication, though having a strong negative bearing on researchers from economically constrained nations. Our study found that peer review speed of journals was not affected by APC’s option. Furthermore, we noted journals were having APC had longer peer review time (89.5 days) compared to journals that did not levy these charges (76.5 days).

Furthermore, concerns are also erupting about the fate of articles not related to the COVID-19 pandemic. Although many journals resorted to speeding the publication of Covid-19 articles, the public interest in non-COVID-19 medical conditions got sidelined and these articles endure significant delays in peer review and publication. This could negatively affect the prospect of young scientists and delayed the dissemination of relevant scientific evidence. The earlier literature suggested a two-track reviewing system of editorial triage to propel both the pandemic and non-pandemic related articles to safeguard the importance of all scientific submissions.

Peer review speed is an essential yardstick for tracking the publication speed of articles. It seems logical that journals also

| Journal Name                                      | Median peer review Time 2019 (days) | Median peer review Time 2020 (days) | $P$  | h-index Issues/year | No of Article 2019 | No of Articles 2020 | APC | Journal Country of origin |
|---------------------------------------------------|-------------------------------------|-------------------------------------|------|--------------------|---------------------|---------------------|-----|--------------------------|
| Acta Anaesthesiologica Scandinavica                | 109.5                               | 112                                 | 0.61 | 103                | 10                  | 24                  | 12  | No Denmark               |
| Anaesthesiology                                   | 202                                 | 168                                 | 0.13 | 225                | 12                  | 24                  | 10  | No USA                   |
| Anesthesiology and Pain Medicine                  | 112                                 | 75                                 | 0.38 | 23                 | 6                   | 24                  | 12  | Yes Iran                 |
| BMC Anesthesiology                                | 146                                 | 104                                 | 0.248| 36                 | 1                   | 24                  | 12  | Yes United Kingdom       |
| Brazilian Journal of Anesthesiology               | 162                                 | 191                                 | 0.5  | 27                 | 6                   | 24                  | 4   | No Brazil                |
| Canadian Journal of Anesthesia                    | 109                                 | 66                                 | 0.065| 92                 | 12                  | 24                  | 12  | No USA                   |
| Indian Journal of Anaesthesia                     | 121.5                               | 65                                 | 0.002*| 26                | 12                  | 24                  | 12  | No India                 |
| Journal of Anesthesia                            | 152                                 | 67.5                               | 0.021*| 42                | 6                   | 24                  | 12  | No Japan                 |
| Journal of Anaesthesiology Clinical Pharmacology  | 216                                 | 19                                 | 0.048*| 28                | 4                   | 24                  | 5   | No India                 |
| Journal of Clinical Anesthesia                    | 53.5                                | 83                                 | 0.63 | 68                 | 8                   | 24                  | 12  | No USA                   |
| Journal of Clinical Monitoring and Computing       | 109                                 | 104                                | 0.479| 48                 | 6                   | 24                  | 12  | No Netherlands           |
| Korean Journal of Anesthesiology                 | 107.5                               | 70                                 | 0.0009*| 26                | 6                   | 24                  | 10  | No Korea                 |
| Minerva Anesthesiologica                         | 177                                 | 110                                | 0.074| 56                 | 12                  | 24                  | 12  | No Italy                 |
| Paediatric Anaesthesia                           | 130.5                               | 95                                 | 0.109| 79                 | 12                  | 24                  | 8   | No United Kingdom        |
| Saudi Journal of Anesthesia                      | 37                                  | 28                                 | 0.151| 22                 | 4                   | 12                  | 12  | No India                 |
| Trends in Anaesthesia and Critical Care          | 69.5                                | 43                                 | 0.375| 20                 | 6                   | 24                  | 12  | No United Kingdom        |

* Wilcoxon signed rank test
might have encountered problems in getting enough expert reviewers. Peer review services are generally non-remunerated and used to get accomplished from the spare time of medical researchers. Many of these reviewers might be busy with their scholarly work or routine clinical engagement, making review requests overwhelming during the pandemic. But must acknowledge with caution that most of our included journals managed to engage enough reviewers to review their submissions; however, who reviewed these articles so expedite remains unclear.\[41\] Nevertheless, the indispensable need for research evidence and scientific information during any crisis should not overlook the quality of peer review and scholarly content’s inherent scrutiny.

The current study has some limitations. Firstly, the peer review timing of only original articles were evaluated in the present study, and other articles like review articles and reports were not included, though account for a sizable share in journals. The study relied on information about data on the date of submission and acceptance from the journal site. We have included only journals indexed in the MEDLINE database, and other anesthesiology journals were not considered. Furthermore, some of the high h-index journals were not included due to the unavailability of dates of submission and acceptance.

To conclude, our analysis revealed that most of the anesthesiology journals managed to curtail their turnaround time for peer review during the pandemic time to showcase solidarity to the global endeavours for rapid information sharing. There was a significant reduction in the peer review time of COVID-19 articles. Journal with higher h-index had longer peer review time. The option for articles processing charges and continents of publishing journals had no impact on peer review speed.

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Conflicts of interest
There are no conflicts of interest.

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