



## A Bibliometric Analysis of Covid-19 Research using VOSviewer

Ida Hamidah<sup>1\*</sup>, Sriyono<sup>1</sup>, Muhammad Nur Hudha<sup>1,2</sup>

<sup>1</sup>Department of Mechanical Engineering Education, Universitas Pendidikan Indonesia,  
Jl. Dr. Setiabudi no 229 Bandung 40154, Indonesia

<sup>2</sup>Manufacturing Physics Education Study Program, Faculty of Science and Technology, Universitas Kanjuruhan  
Malang

Jl. S. Supriadi no 48, Malang-65148. Indonesia

Correspondence: E-mail: [idahamidah@upi.edu](mailto:idahamidah@upi.edu)

### ABSTRACT

The new Coronavirus (namely Covid-19) discovered in 2019 in Wuhan has sickened more than three million people in worldwide. Because Covid-19 is spreading so fast and killing so many people, it has encouraged researchers to conduct research and publish it in various mass media, including journals. This study aims to analyze the scope of Covid-19 research using a bibliometric review. To obtain information about Covid-19 studies, the Scopus database was used. Topic areas with titles, keywords, and abstract criteria in Covid-19 studies were used as a reference for extracting search results. Search result extraction was done using VOSviewer. After that, the results of bibliometric mapping were analyzed further. A total of 3,513 articles were found in the Scopus database accessed on April 25, 2020. There was a significant increase in the number of publications on Covid-19 from 2019 to 2020. Among all countries, China contributed the most publications. Meanwhile, the keywords coronavirus, pandemic, and impact turned out to be the area's most widely discussed. Through VOSViewer we analyzed how many articles have been published about Covid-19 and its relationships to a topic area. This review certainly can provide a reference point for further research related to the Covid-19 outbreak.

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## 1. INTRODUCTION

The disease caused by the new coronavirus or Covid-19 is now a pandemic that is troubling people around the world (Meng *et al.*, 2020). The rapid spread of the coronavirus and its extraordinary killing power has created an unsettling situation for governments, communities, scientists, educators, economists, and especially medical officers (Lima *et al.*, 2020). The pandemic due to coronavirus is extremely concerning and several countries in the world have implemented a lockdown system for its people to prevent the spread of coronavirus which is even worse. As a result, a lockdown system like this has adversely affected various aspects of human life such as social life (Ali & Alharbi, 2020; Koon, 2020), economy (Laing, 2020; Nicola *et al.*, 2020), health (Li, *et al.*, 2020), emotional (Kang *et al.*, 2020; Yang & Ma, 2020), and it has even affected the world of education (Araújo *et al.*, 2020). Various efforts have been made by all parties, including research, to deal with the Covid-19 outbreak. For this reason, a comprehensive study is needed so that it can be used to help other researchers plan the steps in handling Covid-19 outbreaks.

The purpose of this study is to investigate the development of research related to the Covid-19 outbreak in terms of the distribution of bibliometric maps and research/publication trends on the Scopus database using VOSviewer software. Bibliometric is effective for giving dataset that can be used for policy makers, researchers, and other stakeholders for improving quality of research (Nandiyanto *et al.*, 2020). The bibliometric map distribution displayed consists of the type of publication, the topic area being studied, the country of origin of the researcher, the journal in which the publication was published, and the language used.

## 2. METHOD

All articles analyzed in this study were taken from the Scopus database, where Scopus is one of the most comprehensive peer-reviewed journal databases in the world and it can provide good scientific academic information (Klapka & Slaby, 2018). The study was conducted by searching online on April 25, 2020, with the keywords "Covid-19" according to the criteria "titles, keywords and abstract (topic area)". There is no period used in this sampling, considering the topic of Covid-19 is something new.

Sample articles were downloaded in \*.ris format and then processed using HistCite 12.3 software to make it easier in analyzing data. Furthermore, VOSviewer is used to visualize and analyze trends in the form of bibliometric maps (van Eck & Waltman, 2010). VOSviewer can make publication maps, country maps, or journal maps based on networks (co-citation) or build keyword maps based on shared networks (Hudha *et al.*, 2020). The frequency of keywords can be adjusted as desired and less relevant keywords can be removed. VOSviewer software can also be used to do data mining, mapping, and grouping articles that were taken from a database source (Xie *et al.*, 2020).

## 3. RESULTS AND DISCUSSION

### 3.1. Visualization topic area using VOSviewer

The minimum number of relationships with terms in the use of VOSviewer was set to 10 terms. After being analyzed using VosViewer, there were 4 clusters (red, green, blue, and yellow), which showed the relationship between one topic and another. VOSviewer can display bibliometric mapping in three different visualizations; network visualization (Figure 1), overlay visualization (Figure 2), and density visualization (Figure 3). Keywords were labeled with colored circles. The size of the circle is posi-





compared to public health and laboratory (both of these topic areas appear in Figure 1). For this reason, we can provide support in handling the Covid-19 outbreak through the use of technology in learning. Other researchers have shown that utilizing technology can bridge the learning vacuum for students during the Covid-19 outbreak (Almarzooq *et al.*, 2020; Chick *et al.*, 2020).

### 3.2. Visualization of country of study

In addition to bibliometric analysis in the topic area, we can analyze the author, journal, country of study, and the language used in writing. Specifically, for the country of study, bibliometric analysis is shown in Figure 5.

If we search for the term country in Covid-19 in the Scopus database, 229 data will appear. However, if analyzed further, in fact, there are only 95 countries that have conducted such a study. This is due to the

large number of institutions that wrote down affiliations followed by the name of their country so that Scopus reads it as a new country. For example Taiwan; Research Center for Artificial, People's Republic of China, and so on. Although 95 countries are conducting Covid-19 studies, for the simplicity of VOSViewer visualization, we limit them to the top 20 countries with the highest studies. It can be seen that China is the country that has conducted the most studies, followed by the United States and the United Kingdom. Figure 3 also shows that China is a referral center for Covid-19 studies, where all countries conducting Covid-19 studies have a network with China. In other words, these countries refer to articles written by authors from China. This is understandable because the beginning of the new coronavirus outbreak occurred from Wuhan-China.

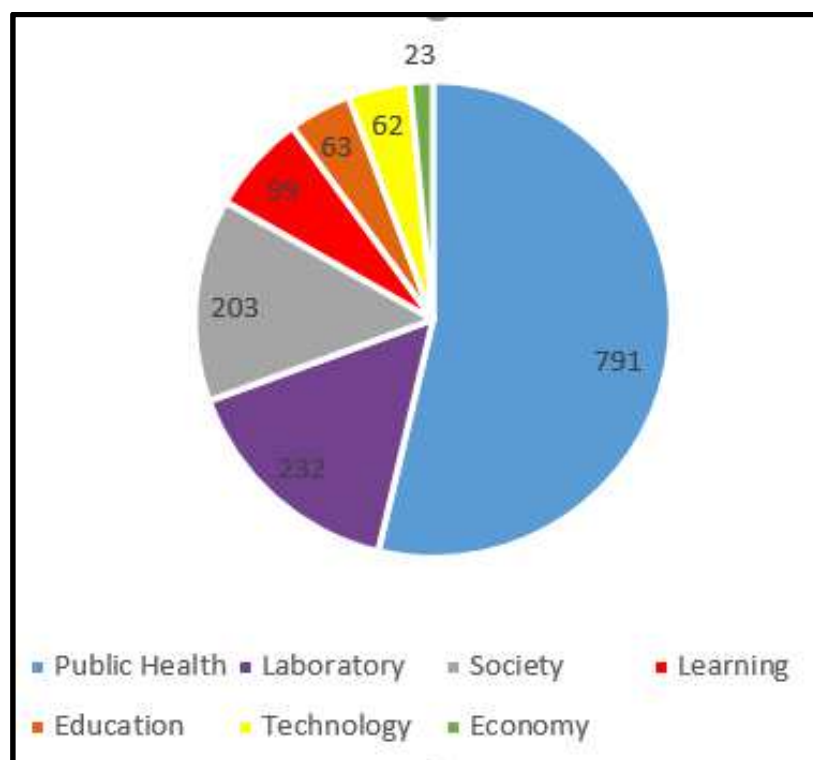


Figure 4. Number of publications in several topic areas

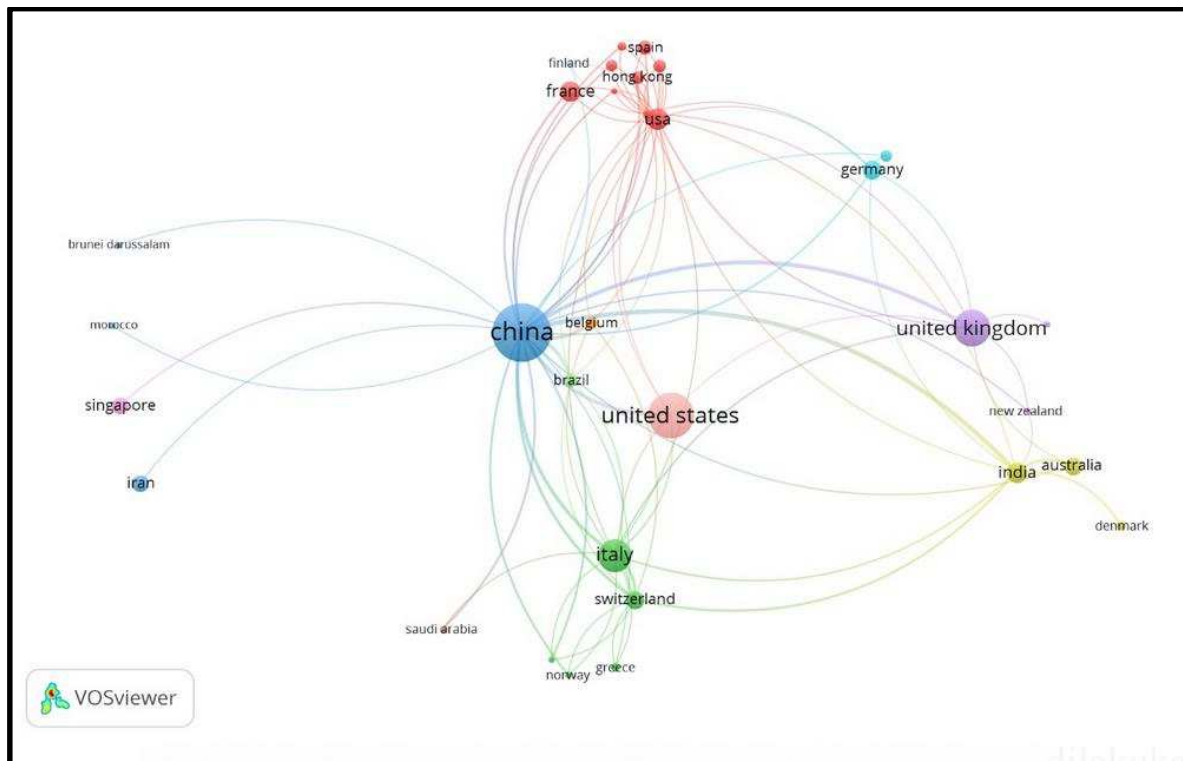


Figure 5. Country of study in terms of Covid-19

#### 4. CONCLUSION

The current Covid-19 epidemic is spreading rapidly. As proof, we have shown many rapidly growing research related to Covid-19. This research drew upon data from various scientific disciplines and their relationships with one another. Although there is no systematic evidence on the subject, this article attempts to configure and visualize the sharing of literature systematically and analyze it through a bibliometric approach. This bibliometric approach was used to identify key themes in each study or scope of knowledge or research that has been done so far and is

useful for determining novelty in conducting further research.

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#### 6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirm that the data and the paper are free of plagiarism.

#### 7. REFERENCES

- Ali, I., & Alharbi, O. M. L. (2020). Science of the Total Environment COVID-19 : Disease , management , treatment , and social impact. *Science of the Total Environment*, 728, 1–6.
- Almarzooq, Z., Lopes, M., & Kochar, A. (2020). Virtual Learning during the COVID-19 Pandemic: A Disruptive Technology in Graduate Medical Education. [https://www.researchgate.net/profile/Zaid\\_Almarzooq/publication/340671780\\_Virt](https://www.researchgate.net/profile/Zaid_Almarzooq/publication/340671780_Virt)

- [ual Learning during the COVID-19 Pandemic A Disruptive Technology in Graduate Medical Education/links/5e9d0643a6fdcca789284505/Virtual-Learning-during-the-COVID-19-Pandemic-A-Disruptive-Technology-in-Graduate-Medical-Education.pdf](https://doi.org/10.17509/ijost.v5i2.24522), retrieved on February 20, 2020.
- Araújo, F. J. de O., de Lima, L. S. A., Cidade, P. I. M., Nobre, C. B., & Neto, M. L. R. (2020). Impact Of Sars-Cov-2 And Its Reverberation In Global Higher Education And Mental Health. *Psychiatry Research*, 288, 112977.
- Chick, R. C., Clifton, G. T., Peace, K. M., Propper, B. W., Hale, D. F., Alseidi, A. A., & Vreeland, T. J. (2020). Using Technology to Maintain the Education of Residents During the COVID-19 Pandemic. *Journal of Surgical Education*, in press.
- Hudha, M. H., Hamidah, I., Permanasari, A., Abdullah, A. G., Rachman, I., & Matsumoto, T. (2020). Low Carbon Education: A Review and Bibliometric Analysis. *European Journal of Educational Research*, 9(1), 319–329.
- Kang, L., Ma, S., Chen, M., Yang, J., Wang, Y., Li, R., Liu, Z. (2020). Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain, Behavior, and Immunity*, in press.
- Klapka, O., & Slaby, A. (2018). Visual Analysis of Search Results in Scopus Database. In International Conference on Theory and Practice of Digital Libraries (pp. 340–343). Springer, [https://link.springer.com/chapter/10.1007/978-3-030-00066-0\\_36](https://link.springer.com/chapter/10.1007/978-3-030-00066-0_36), retrieved on Feb 20, 2020.
- Koon, O. E. (2020). “The impact of socio-cultural influences on the COVID-19 measures – reflections from Singapore.” *Journal of Pain and Symptom Management*. in press
- Laing, T. (2020). The economic impact of the Coronavirus 2019 (Covid-2019): Implications for the mining industry. *The Extractive Industries and Society*. In press
- Li, J.-W., Han, T.-W., Woodward, M., Anderson, C. S., Zhou, H., Chen, Y.-D., & Neal, B. (2020). The impact of 2019 novel coronavirus on heart injury: A systemic review and Meta-analysis. *Progress in Cardiovascular Diseases*, in press.
- Lima, C. K. T., Carvalho, P. M. de M., Lima, I. de A. A. S., Nunes, J. V. A. de O., Saraiva, J. S., de Souza, R. I., & Neto, M. L. R. (2020). The emotional impact of Coronavirus 2019-nCoV (new Coronavirus disease). *Psychiatry Research*, 287, 112915.
- Meng, L., Hua, F., & Bian, Z. (2020). Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine. *Journal of Dental Research*, 99(5) 481-487.
- Nandiyanto, A. B. D., Biddinika, M. K., & Triawan, F. (2020). How bibliographic dataset portrays decreasing number of scientific publication from Indonesia. *Indonesian Journal of Science and Technology*, 5(1), 154-175.
- Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., & Al-jabir, A. (2020). The Socio-Economic Implications of the Coronavirus and COVID-19 Pandemic: A review. *International Journal of Surgery*. In press.
- van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 84(2), 523–538.
- Xie, L., Chen, Z., Wang, H., Zheng, C., & Jiang, J. (2020). Bibliometric and Visualized Analysis of Scientific Publications on Atlantoaxial Spine Surgery Based on Web of Science and VOSviewer. *World Neurosurgery*, 137, 435-442.

Yang, H., & Ma, J. (2020). How an Epidemic Outbreak Impacts Happiness: Factors that Worsen (vs. Protect) Emotional Well-being during the Coronavirus Pandemic. *Psychiatry Research*, 289, 113045.