Holistic Analysis of Coronavirus Literature: A Scientometric Study of the Global Publications Relevant to SARS-CoV-2 (COVID-19), MERS-CoV (MERS) and SARS-CoV (SARS)

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ABSTRACT

Objectives: In late December 2019, a cluster of patients with pneumonia caused by an unknown pathogen was reported from Wuhan, Hubei Province, China. The pathogen has been identified as a novel coronavirus, severe acute respiratory syndrome 2 (SARS-CoV-2) and the disease has been named as coronavirus disease 2019 (COVID-19). The objective of this study was to perform the first holistic scientometric evaluation of coronavirus publications.

Methods: Our main source for this study was Web of Science Collection database. All items published between 1980 and 2019 were included. A distribution map of global production in coronavirus literature and scientometric networks were generated.

Results: The United States, China, Germany, the United Kingdom, and Netherlands were the most productive countries. Publications in coronavirus literature have been produced from almost every country in the world, except for some countries in Asia and Africa.

Conclusion: While in the 1980s, the United States and developed countries from Europe were major source countries and the virus was identified only as an animal disease in the literature and its biological and genetic structure was investigated, in the 2000s, China became a major contributor of coronavirus literature because the SARS outbreak originated from southern China. Almost all most-cited publications in this period are related to SARS and the ACE2 protein.

Key Words: bibliometrics, coronavirus, COVID-19, MERS, SARS, SARS-CoV-2, SARS-CoV, scientometrics

In late December 2019, a cluster of cases with pneumonia caused by an unknown etiology was reported from Wuhan, Hubei Province, China.1 Later, the cause of the disease was identified as a novel betacoronavirus, the 2019 novel coronavirus (2019-nCoV). The disease was coined as coronavirus disease 2019 (COVID-19). Recently, the official name of the virus that causes COVID-19 has been announced by World Health Organization (WHO) as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).1

Scientometrics, also known as “Science of science,” is a popular statistical method analyzing scientific literature thoroughly in a certain field.3 The academic literature lacks an in-depth scientometric study evaluating coronaviruses and disease caused by them. Herein, we aimed to perform a holistic scientometric assessment of the coronavirus literature.

METHODS

Our main source of this study was Web of Science (WoS, Thomson Reuters, New York, NY) Core Collection database. We preferred WoS as our main data source because it provides data analysis for publications and citations and allows the results to be sorted according to the number of citations. In addition, WoS attribution data are considered more reproducible and reliable than other databases, and WoS is used as the standard by certain official organizations.4 We used keywords of “coronavirus,” “SARS,” “SARS-CoV”, “MERS”, “MERS-CoV”, and “COVID-19” for our analysis. All items published between 1980 and 2019 were included, and documents produced in 2020 were excluded for our major analysis. A distribution map of global production of coronavirus literature was generated by a free Web source named GunnMap.5 VOSviewer freeware was used to create scientometric networks.6
RESULTS

General Features of Coronavirus Literature

A total of 13,833 documents indexed in WoS Core Collection between 1980 and 2019 were found in coronavirus literature, 7339 of which were open access. The peak year for publication was 2016 with 837 papers and 106 articles have been produced in 2020 so far. English was the major language of coronavirus literature (96.957%) followed by French, German, Spanish, and Chinese (0.802, 0.766, 0.289, and 0.231, respectively).

Performances of the Countries, Authors, Institutions, and Sources

The United States of America (USA) ranked first in coronavirus literature with 4894 articles (35.379%) followed by China, Germany, the United Kingdom (UK) and the Netherlands (16.663, 6.701, 6.448, and 5.711%, respectively). Publications in coronavirus literature have been produced from almost every country in the world, except for some countries in Asia and Africa (Figure 1). Yuen from the University of Hong Kong (China) was the most prolific author with 218 indexed papers (1.576%, Table 1). University of Hong Kong was also detected as the most productive institution in the literature with 534 publications (3.86%; Table 1). Journal of Virology, Virology and Advances in Experimental Medicine and Biology were the most contributor source titles in coronavirus literature (N=1166, 510, and 370 items, respectively; Table 1).

Citations, Decades, and Scientometric Networks Analyses

1980-1989

Our search yielded 641 articles in the period of 1980 to 1989. The United States, Federal Republic of Germany, the United Kingdom, Canada, and France dominated coronavirus literature in this period (36.661, 13.417, 12.168, 9.204 and 7.826, respectively). The most prolific author was Termeulen V with 37 items. The Journal of General Virology and University of Würzburg (Germany) stood out in their categories in this period. H-index of coronavirus literature for this period was calculated as 79 and total number of citations was 21,682 (18,643 without self-citations). Average citations per item were 39.38. The most cited document was an original article titled “Characterization of An Efficient Coronavirus Ribosomal Frameshifting Signal - Requirement for An RNA Pseudoknot” written by Brierley et al. (Table 1).

1990-1999

Coronavirus literature had 1674 documents indexed between 1990 and 1999. The United States, Germany, Canada, the United Kingdom, and the Netherlands were the most productive countries between 1990 and 1999 (44.265, 8.961, 8.303, 8.244, and 7.826, respectively). Lai from University of Southern California (USA) was the most prolific author with 70 documents. The Journal of Virology was the prominent source title in this decade with 226 articles (13.501%), and University of Southern California (USA) was the most contributor institution with 96 papers (5.735%). H-index was measured as 105 and published documents were cited 63,445 times in this period (53,214 without self-citations). The most cited document was an original article titled “Community Study of Role of Viral-Infections in Exacerbations of Asthma In 9-11-Year-Old Children” by Johnston et al. (Table 1). As we analyzed scientometric network analysis of coronavirus literature in this period the most indexed keywords were detected to be “coronavirus,” “mouse hepatitis virus,” “transmissible gastroenteritis virus,” “rotavirus,” and “cat” (Table 1).

2000-2009

A total of 4810 documents was produced in coronavirus literature between 2000 and 2009, and 82.682% of all items were original articles. The United States, China, Canada, Germany, and Netherlands were the most productive countries (N=1679, 1202, 324, 322, and 278 papers, respectively). University of Hong Kong (China), Chinese Academy of Sciences (China), and Chinese University of Hong Kong (China) were the most contributor institutions in this period (5.925, 4.595, and 3.576%, respectively). Yuen form the University of Hong Kong (China) was the most prolific author with 110 papers (2.287%) and the most productive source titles were detected to be Journal of Virology, Virology and Advances in Experimental Medicine and Biology (10, 3.493 and 3.222%, respectively). H-index for this decade was 165 and total number of citations was 189,424 (135,829 without self-citations). Average citations per item were 39.38. The most cited document in this period was an original article written by SARS Working Group, Ksiazek et al., titled “A novel coronavirus associated with severe acute respiratory syndrome” published in The New England Journal of Medicine in 2003 (Table 1). The most indexed keywords were detected to be “coronavirus,” “SARS-CoV,” and “spike protein” (Table 1). Scientometric network map of the most used keywords showed a starburst pattern in which the keywords of “coronavirus,” “SARS,” “SARS coronavirus,” and “SARS-CoV” centered.

2010-2019

The decade of 2010s was the most active period of the literature with 6601 documents. Most documents (N=4146; 62.8%) were open access and 80.7% of all items were original articles. The United States, producing 33.586% of all coronavirus literature, ranked first as ever, followed by China, Germany, Saudi Arabia, and The United Kingdom (22.406, 6.575, 6.454, and 6.166%, respectively). University of
TABLE 1

Features of Coronavirus Literature

| Document Types          | Number | %     |
|-------------------------|--------|-------|
| Original article        | 11,138 | 80.518|
| Review                  | 1,182  | 8.545 |
| Proceedings paper       | 641    | 4.634 |
| Editorial material      | 374    | 2.704 |
| Meeting abstract        | 344    | 2.487 |
| Book chapter            | 291    | 2.104 |
| Letter                  | 256    | 1.851 |
| Note                    | 185    | 1.337 |
| News item               | 82     | 0.593 |
| Correction              | 55     | 0.398 |
| Early access            | 34     | 0.246 |
| Book                    | 6      | 0.043 |
| Correction              | 3      | 0.022 |
| Data paper              | 1      | 0.007 |

Research Areas

- Virology: 4411 (31.888)
- Veterinary sciences: 2093 (15.130)
- Infectious diseases: 1613 (11.661)
- Immunology: 1558 (11.263)
- Microbiology: 1519 (10.981)
- Biochemistry: 1347 (9.738)
- Biotechnology: 816 (5.899)
- Experimental: 658 (4.757)
- Multidisciplinary sciences: 598 (4.323)
- Internal medicine: 459 (3.318)

Top 10 Authors

1. Yuen KY (The University of Hong Kong, China): 218 (1.576)
2. Perlman S (University of Iowa, USA): 189 (1.366)
3. Enjuanes L (Autonomous University of Madrid, Spain): 176 (1.272)
4. Baric RS (University of North Carolina, USA): 171 (1.236)
5. Weiss SR (University of Pennsylvania, USA): 150 (1.084)
6. Drosten C (Berlin Institute of Health, Germany): 148 (1.070)
7. Rottier PJM (Utrecht University, The Netherlands): 134 (0.969)
8. Woc POY (The University of Hong Kong, China): 129 (0.933)
9. Chan KH (The University of Hong Kong, China): 122 (0.882)
10. Lau SKP (The University of Hong Kong, China): 120 (0.867)

Top 10 Institutions

1. University of Hong Kong (China): 534 (3.860)
2. Chinese Academy of Sciences (China): 396 (2.863)
3. Utrecht University (The Netherlands): 335 (2.422)
4. University of California System (USA): 333 (2.407)
5. National Institutes of Health (USA): 328 (2.371)
6. University Of North Carolina (USA): 273 (1.974)
7. Centers for Disease Control Prevention (USA): 258 (1.865)
8. Chinese University of Hong Kong (China): 229 (1.655)
9. University Of North Carolina (USA): 223 (1.612)
10. University of Pennsylvania (USA): 216 (1.561)

Top 10 Source Titles

1. Journal of Virology: 1166 (8.429)
2. Virology: 510 (3.687)
3. Advances in Experimental Medicine and Biology: 370 (2.675)
4. Journal of General Virology: 330 (2.386)
5. Archives of Virology: 263 (1.901)
6. Emerging Infectious Diseases: 245 (1.771)
7. Virus Research: 245 (1.771)
8. PLOS One: 239 (1.728)
| Article                                                                 | Author                                      | Journal Name/Published in          | Total Citation | Average Citations per Year |
|------------------------------------------------------------------------|---------------------------------------------|------------------------------------|----------------|-----------------------------|
| Characterization of An Efficient Coronavirus Ribosomal Frameshifting Signal - Requirement for An RNA Pseudoknot | Brierley, I; Digard, P; Inglis, SC          | Cell 1980-1989 (n = 641)           | 466            | 14.56                       |
| Coronaviruses - Structure and Genome Expression                         | Spaan, W; Cavanagh, D; Horzinek, MC         | Journal of Virology                | 393            | 11.91                       |
| The Biology and Pathogenesis of Coronaviruses                          | Wege, H; Siddell, S; Termeulen, V           | Current Topics in Microbiology and Immunology | 303            | 7.77                        |
| Completion of The Sequence of The Genome of The Coronavirus Avian Infectious-Bronchitis Virus | Boursnell, MEG; Brown, TDK; Foulds, IJ; et al. | Journal of Virology                | 302            | 8.88                        |
| Pathogenicity of Antigenic Variants of Murine Coronavirus JHM Selected with Monoclonal-Antibodies | Fleming, JO; Trousdale, MD; Elzaatari, FAK; et al. | Journal of Virology                | 266            | 7.60                        |
| Isolation of Coronavirus Envelope Glycoproteins and Interaction with The Viral Nucleocapsid | Sturman, LS; Holmes, KV; Behnke, J          | Journal of Virology                | 239            | 5.83                        |
| An Efficient Ribosomal Frame-Shifting Signal in The Polymerase-Encoding Region of The Coronavirus IBV | Brierley, I; Boursnell, MEG; Binns, MM; et al. | EMBO Journal 1980-1989 (n = 641)   | 236            | 6.94                        |
| The Biology of Coronaviruses                                          | Siddell, S; Wege, H; Termeulen, V          | Journal of Virology                | 227            | 5.97                        |
| Coronavirus Genome - Prediction of Putative Functional Domains in The Non-Structural Polyprotein by Comparative Amino-Acid Sequence-Analysis | Gorbulev, AE; Koonin, EV; Donchenko, AP; et al. | Nucleic Acids Research 1990-1999 (n = 1674) | 223            | 6.97                        |
| Proteolytic Cleavage of The E2-Glycoprotein of Murine Coronavirus - Activation of Cell-Fusing Activity of Virions by Trypsin and Separation Of 2 Different 90k-Cleavage Fragments | Sturman, LS; Ricard, CS; Holmes, KV         | Journal of Virology                | 215            | 5.97                        |
| Community Study of Role of Viral-Infections in Exacerbations of Asthma In 9-11-Year-Old Children | Johnston, SL; Pattemore, PK; Sanderson, G; et al. | British Medical Journal 1990-1999 (n = 1674) | 1328           | 51.08                       |
| Psychological Stress and Susceptibility to The Common Cold             | Cohen, S; Tyrrell, DAJ; Smith, AP           | New England Journal of Medicine    | 1005           | 33.50                       |
| Respiratory Viruses and Exacerbations of Asthma in Adults              | Nicholson, KG; Kent, J; Ireland, DC        | British Medical Journal            | 796            | 28.43                       |
| Lelystad Virus, The Causative Agent of Porcine Epidemic Abortion and Respiratory Syndrome (Pears), Is Related to LDV and EAV | Meulenberg, JJM; Hulst, MM; Demeijer, EJ; et al. | Virology 1990-1999 (n = 1674)     | 607            | 21.68                       |
| Lai, MMC; Cavanagh, D                                                  | Advances in Virus Research                  |                                    | 545            | 22.71                       |
| Article | Author | Journal Name/Published in | Total Citation | Average Citations per Year |
|---------|--------|---------------------------|----------------|--------------------------|
| The Molecular Biology of Coronaviruses Isolation and Direct Characterization of Resident Microglial Cells from The Normal and Inflamed Central-Nervous-System RNA Recombination in Animal and Plant-Viruses Porcine Reproductive and Respiratory Syndrome Virus Comparison: Divergent Evolution on Two Continents Human Aminopeptidase-N Is A Receptor for Human Coronavirus-229e Aminopeptidase-N Is A Major Receptor for The Enteropathogenic Coronavirus TGEV | Sedgwick, JD; Schwenger, S; Imrich, H; et al. | Proceedings of The National Academy of Sciences of The United States of America | 533 | 17.77 |
| | Lai, MMC | Microbiological Reviews | 495 | 17.07 |
| | Nelsen, CJ; Murtaugh, MP; Faaberg, KS | Journal of Virology | 484 | 22.00 |
| | Yeager, CL; Ashmun, RA; Williams, RK; et al. | Nature | 454 | 15.66 |
| | Delmas, B; Gelfi, J; Lharidon, R; et al. | Nature | 425 | 14.66 |
| A novel coronavirus associated with severe acute respiratory syndrome Identification of a novel coronavirus in patients with severe acute respiratory syndrome Characterization of a novel coronavirus associated with severe acute respiratory syndrome Coronavirus as a possible cause of severe acute respiratory syndrome The genome sequence of the SARS-associated coronavirus Cloning of a human parvovirus by molecular screening of respiratory tract samples Angiotensin-converting enzyme 2 is a functional receptor for the SARS coronavirus Isolation and characterization of viruses related to the SARS coronavirus from animals in Southern China Bats are natural reservoirs of SARS-like coronaviruses Clinical progression and viral load in a community outbreak of coronavirus-associated SARS pneumonia: a prospective study | Ksiazek, TG; Erdman, D; Goldsmith, CS; et al. | New England Journal of Medicine | 1829 | 101.61 |
| | Drosten, C; Gunther, S; Preiser, W; et al. | New England Journal of Medicine | 1739 | 96.61 |
| | Rota, PA; Oberste, MS; Monroe, SS; et al. | Science | 1488 | 82.67 |
| | Peiris, JSM; Lai, ST; Poon, LLM; et al. | Lancet | 1439 | 79.94 |
| | Marra, MA; Jones, SJM; Astell, CR; et al. | Science | 1274 | 70.78 |
| | Allander, T; Tammi, MT; Eriksson, M; et al. | Proceedings of The National Academy of Sciences of The United States of America | 1021 | 63.81 |
| | Li, WH; Moore, MJ; Vasilieva, N; et al. | Nature | 968 | 53.78 |
| | Guan, Y; Zheng, BJ; He, YQ; et al. | Science | 884 | 49.11 |
| | Li, WD; Shi, ZL; Yu, M; et al. | Science | 844 | 52.75 |
| | Peiris, JSM; Chu, CM; Cheng, VCC; et al. | Lancet | 826 | 45.89 |

2000-2009 (n = 4180) | Isolation of a Novel Coronavirus from a Man with Pneumonia in Saudi Arabia Hospital Outbreak of Middle East Respiratory Syndrome Coronavirus Human infections with the emerging avian influenza A H7N9 | Zaki, Ali Moh; van Boheemen, Sander; Bestebroer, Theo M.; et al. | New England Journal of Medicine | 1295 | 143.89 |
| | Assiri, Abdullah; McGeer, Allison; Perl, Trish M.; et al. | New England Journal of Medicine | 544 | 68.00 |
| | Chen, Yu; Liang, Weifeng; Yang, Shigui; et al. | Lancet | 544 | 68.00 |
### TABLE 1

**Continued**

| Article | Author | Journal Name/Published in | Total Citation | Average Citations per Year |
|---------|--------|---------------------------|----------------|-----------------------------|
| Virus from wet market poultry: clinical analysis and characterization of viral genome | Raj, V. Stalin; Mou, Huihui; Smits, Saskia L.; *et al.* | Nature | 467 | 58.38 |
| Dipeptidyl peptidase 4 is a functional receptor for the emerging human coronavirus-EMC | Ruuskanen, Olli; Lahti, Elina; Jennings, Lance C.; *et al.* | Lancet | 448 | 44.80 |
| Viral pneumonia | Chou, Kuo-Chen | Medicinal Chemistry | 379 | 63.17 |
| Impacts of Bioinformatics to Medicinal Chemistry | van Boheemen, Sander; de Graaf, Miranda; Lauber, Chris; *et al.* | mBio | 362 | 40.22 |
| Genomic Characterization of a Newly Discovered Coronavirus Associated with Acute Respiratory Distress Syndrome in Humans | Assiri, Abdullah; Al-Tawfiq, Jaffar A.; Al-Rabeeah, Abdullah A.; *et al.* | Lancet Infectious Diseases | 360 | 45.00 |
| Epidemiological, demographic, and clinical characteristics of 47 cases of Middle East respiratory syndrome coronavirus disease from Saudi Arabia: a descriptive study | Reusken, Chantal B. E. M.; Haagmans, Bart L.; Mueller, Marcel A.; *et al.* | Lancet Infectious Diseases | 350 | 43.75 |
| Middle East respiratory syndrome coronavirus neutralising serum antibodies in dromedary camels: a comparative serological study | de Groot, Raoul J.; Baker, Susan C.; Baric, Ralph S.; *et al.* | Journal of Virology | 330 | 41.25 |

### Top Used Keywords (Occurrences, total link strength)

| Year | Keyword | Total Occurrences | Total Link Strength |
|------|---------|-------------------|--------------------|
| 1990–1999 | Coronavirus | 64, 125 | 125 |
| 2 | Mouse hepatitis virus | 48, 93 | 93 |
| 3 | Transmissible gastroenteritis virus, TGEV | 12, 39 | 39 |
| 4 | Rotavirus | 11, 27 | 27 |
| 5 | Cat | 9, 30 | 30 |
| 6 | Feline infectious peritonitis | 9, 24 | 24 |
| 7 | RT-PCR | 9, 14 | 14 |
| 8 | MHV | 9, 12 | 12 |
| 9 | Demyelination | 8, 18 | 18 |
| 10 | Infectious bronchitis virus | 8, 12 | 12 |
| 11 | Porcine | 7, 22 | 22 |
| 12 | Gastroenteritis | 7, 20 | 20 |
| 13 | Feline coronavirus | 7, 14 | 14 |
| 14 | Porcine respiratory virus | 6, 20 | 20 |
| 15 | Virus | 6, 17 | 17 |
| 16 | Diagnosis | 6, 15 | 15 |
| 17 | Diarrhea | 6, 12 | 12 |
| 18 | Pig | 6, 11 | 11 |
| 19 | Serology | 5, 14 | 14 |
| 20 | Macrophage | 5, 13 | 13 |

*a Total percentage may exceed 100% because certain items were included in more than 1 category.

*b Of total documents published in coronavirus disease literature.
Hong Kong (China), National Institutes of Health (USA), Chinese Academy of Sciences (China), and University of California System (USA) stood out from the rest (3.681, 2.787, 2.575, and 2.439%, respectively) and Drosten from Charité – Universitätsmedizin (Germany) was the most prolific author of this period with 113 articles. A total of 6111 articles were analyzed for the citation analysis. H-index of this period was measured as 106. Indexed documents were cited 109,418 times (53,521 times without self-citations). An original article titled "Isolation of a Novel Coronavirus from a Man with Pneumonia in Saudi Arabia" written by Zaki indexed in The New England Journal of Medicine in 2012 (Table 1). The most indexed keywords were "coronavirus," "MERS-CoV," "epidemiology," and "SARS-CoV" (Table 1). Scientometric network analysis of keywords revealed relative keywords such as "Saudi Arabia," "MERS-CoV," "outbreak," "vaccine," "camel," and "zoonosis."

**FIGURE 1**

Publication Density of World Countries in Coronavirus Literature.

Hong Kong (China), National Institutes of Health (USA), Chinese Academy of Sciences (China), and University of California System (USA) stood out from the rest (3.681, 2.787, 2.575, and 2.439%, respectively) and Drosten from Charité – Universitätsmedizin (Germany) was the most prolific author of this period with 113 articles. A total of 6111 articles were analyzed for the citation analysis. H-index of this period was measured as 106. Indexed documents were cited 109,418 times (53,521 times without self-citations). An original article titled "Isolation of a Novel Coronavirus from a Man with Pneumonia in Saudi Arabia" written by Zaki indexed in The New England Journal of Medicine in 2012 (Table 1). The most indexed keywords were "coronavirus," "MERS-CoV," "epidemiology," and "SARS-CoV" (Table 1). Scientometric network analysis of keywords revealed relative keywords such as "Saudi Arabia," "MERS-CoV," "outbreak," "vaccine," "camel," and "zoonosis."

**DISCUSSION**

It is important to analyze the coronavirus literature based on periods, because it helps us understand the progression of the disease. In the 1980s, the United States and developed countries from Europe were major source countries. During this period, the virus was identified only as an animal disease in the literature, and its biological and genetic structure was investigated. In the second decade we investigated (1990s), the United States and European countries stood out again and the coronaviruses started to be examined in terms of whether it affected the health of animals and people with asthma (Table 1). In fact, in this period, the effects of these
viruses on the human respiratory system were underlined in the literature and perhaps early measures could be taken for a possible global eradication of coronaviruses. Of course, this is just our hypothetical and speculative interpretation.

The 2000s can be called as the SARS period in the coronavirus literature. In November 2002, a novel respiratory system disease coined as SARS was identified in China caused by SARS-CoV. This disease caused global anxiety, because it progressed through an outbreak and epidemic in 26 countries and more than 8000 people were affected. In the literature of the 2000s, China became a major contributor of coronavirus literature because the SARS outbreak originated from Guangdong province of southern China. Almost all most-cited publications in this period are related to SARS and ACE2 protein. SARS-CoV is “thought to be an animal virus from an as-yet-uncertain animal reservoir, perhaps bats, that spread to other animals (civet cats)” according to WHO. We want to draw attention to one of the most cited articles in this period titled “Bats are natural reservoirs of SARS-like coronaviruses” written by Li et al. published in Science in 2005 (Table 1). The authors reported that species of bats were a natural host of coronaviruses closely related to those responsible for the SARS outbreak. In the conclusion paragraph of this manuscript, Li et al. suggested in-depth investigation of reservoir host distribution, animal-animal and human-animal interaction (particularly within the wet-market system), and analyzing genetic diversity of bat-borne viruses to avoid future outbreaks.8

In April 2012, a novel lethal zoonotic pathogen, MERS-CoV, was identified in humans in Saudi Arabia and Jordan. A total of 2499 confirmed cases and 858 deaths (mortality rate, 34.3%) were reported from 27 countries. Outbreaks caused by human-human transition in Saudi Arabia in 2014 and South Korea in 2015 occurred. In 2010s, Saudi Arabia became one of the major sources in coronavirus literature. Almost all most-cited articles were related to MERS in this period.

We found only one scientometric document relevant to coronavirus literature. It was a letter with limited data and no tables or images revealing scientometric networks. The authors reported that the United States and China had primary roles in the literature.10

CONCLUSIONS

In late 2019, a novel coronavirus causing SARS-like pneumonia was identified. This novel virus was temporarily named as SARS-CoV-2 and the disease has been coined as COVID-19 by the WHO.2 By the date of writing this study, a total of 167,682 confirmed patients and 6456 deaths were reported from 157 countries and territories, and the COVID-19 outbreak has been officially declared as pandemic. We hypothesized that the COVID-19 pandemic could be prevented if the suggestions of the articles previously published, such as that by Lie et al., were taken into consideration and the wet-markets were completely closed to cut off the human-animal interaction. Scientometric studies should be performed in certain diseases that previously caused epidemics to prevent global spread in the future and to take urgent measures.

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Conflict of Interest

None declared.