STATISTICAL ANALYSIS OF COVID-19 PUBLICATIONS IN THE FIELDS OF PEDIATRICS

Pediatri Alanında COVID-19 Yayınlarının İstatistiksel Analizi

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ABSTRACT	ÖZ

Objective: This study aims to conduct the statistical analysis of the scientific outputs about COVID-19 in the field of Pediatrics, identify the top effective studies, and reveal the trend topics.

Material and Methods: Statistical analysis was performed for all the publications published between 2019 and 2020 in the "Pediatrics" research area in the Web of Science database and included the "COVID-19", "SARS-CoV-2", "2019-nCoV", "n-CoV", and "coronavirus" keywords in their title.

Results: The literature review indicated 15140 publications, 397 (2.62%) of which were in the "Pediatrics" research area. The top 3 journals that had the highest number of publications were Pediatric Blood & Cancer, Lancet Child & Adolescent Health, Pediatric Pulmonology. The top-cited 3 articles were published in the journals of Translational Pediatrics, Pediatric Pulmonology, Acta Paediatrica. According to the trend analysis results, the trend topics included the keywords such as pregnancy, neonate(s), newborn(s), adolescents, breastfeeding, treatment, epidemiology, pneumonia, vertical transmission, asthma, breast milk, clinical characteristics, computed tomography, diagnosis, human milk, infant, myocarditis, survey, and symptoms.

Conclusion: The pandemic affecting the whole world has also changed the course of academic publications. This bibliometric study provided a summary of the publications about COVID-19 in the field of Pediatrics.

Amaç: Bu çalışmada Pediatri araştırma alanında COVID-19 konusunda yapılan bilimsel yayınları istatistiksel olarak analiz ederek en etkili çalışmaları belirlemek, güncel konuları ortaya çıkarmak amaçlanmıştır.

Gereç ve Yöntemler: 2019-2020 yılları arasında yayınlanan ve Web of Science veri tabanında "Pediatri" araştırma alanında etiketlenen yayınlar içerisinde başlığında "COVID-19", "SARS-CoV-2", "2019-nCoV", "n-CoV", and "coronavirus" anahtar kelimeleri geçen tüm yayınlar istatistiksel olarak analiz edildi.

Bulgular: Literatür taramasında 15140 yayın bulundu. En fazla yayın yapan ilk 3 dergi Pediatric Blood & Cancer, Lancet Child & Adolescent Health ve Pediatric Pulmonology idi. En fazla atıf alan ilk 3 makale Translational Pediatrics, Pediatric Pulmonology ve Acta Paediatrica dergilerinde yayınlanmıştı. Trend analiz sonuçlarına göre en fazla çalışılan anahtar kelimelerin gebelik, yenidoğan, ergenler, emzirme, tedavi, epidemiyoloji, pnömoni, bulaşı, astım, anne sütü, klinik özellikler, bilgisayarlı tomografi, tanı, bebek, miyokardit, anket ve semptomlar gibi konular olduğu belirlendi.

Sonuç: Tüm dünyayı etkileyen pandemi, akademik yayın seyrini de değiştirmiştir. Yaptığımız bu bibliyometrik çalışmada pediatri araştırma alanında COVID-19 konusunda yapılan yayınların özet bilgisi sunuldu.

Keywords: COVID-19; SARS-CoV-2; 2019-nCoV; coronavirus; bibliometric analysis

Anahtar Kelimeler: COVID-19; SARS-CoV-2; 2019-nCoV; koronavirüs; bibliyometrik analiz

INTRODUCTION

Since the middle of December 2019, a new type of coronavirus infection has been prevalent in Wuhan, China, and has rapidly spread to a large area (1). To date, the disease epidemic caused by this virus has rapidly spread to all parts of China and 197 countries abroad (2). Children were susceptible to COVID-19 like adults, while the clinical presentations and outcomes were more favorable in children (3). In Singapore, Japan, Korea, Italy, and Thailand, there have been community-based infections. A few cases of pneumonia in children with SARS-CoV-2 infection were reported (4). Pediatric cases are mainly family cluster cases, and most of them have epidemiological links to adult patients. Although the number of reported pediatric patients is small at this point, children are vulnerable to the infection (5). The epidemiological and clinical patterns of COVID-19 and treatment approaches in pediatric patients still remain unclear although many pediatric reports are published.

Bibliometrics is the statistical analysis of scientific studies published on a specific topic or research area (6-8). In addition to providing a summary of many studies published on a specific topic, bibliometric studies present new ideas to researchers by demonstrating the trend topics (9,10). Bibliometric analyses enable to reveal a lot of information on a specific topic regarding the top-cited effective studies, countries, authors, and institutions (11,12).

This study aims to conduct the bibliometric analysis of the scientific outputs about COVID-19 in the field of Pediatrics, identify the top effective studies, and reveal the trend topics.

MATERIALS AND METHODS

The literature review was done using the Web of Science (WoS: by Clavariate Analytics) database (access date 10.06.2020). Bibliometric analysis was performed for all the publications published between 2019 and 2020 in the WoS database in the "Pediatrics" research area and included the "COVID-19", "SARS-CoV-2", "2019-nCoV", "n-CoV", and "coronavirus" keywords in their title *(Title: (COVID) or Title: ("SARS-CoV-2") or Title: (nCoV) or Title: (Coronavirus) Refined By: Research Areas: (Pediatrics) Timespan: 2019-2020. Indexes: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI.).* Bibliometric network visualizations were performed using the VoS viewer (Version 1.6.15) package program (13).

RESULTS

The literature review indicated 15140 publications, 397 (2.62%) of which were in the "Pediatrics" research area. Of these publications, 132 were "Early Access" 122 were "Articles, 115 were "Editorial materials", 108 were "Letters", 44 were "Reviews" and the rest were others (6 News Items, 1 Correction, and 1 Meeting Abstract).

Active Organization

The 6 organizations that produced the highest number of publications (more than 7 publications) were All India Inst Med Sci (11), Huazhong Univ Sci Technol (11), Harvard Med Sch (10), Univ Milan (9), Capital Med Univ (8) and Univ Melbourne (8).

Active Authors

The 6 authors who produced the highest number of publications (more than 4 publications) were Schiariti V (7), Lodha R (6), Lu XX (6), Lakshminrusimha S (5), Passi GR (5) and Shu Q (5) respectively.

Active Countries

Figure 1 demonstrates the distribution of the top 23 countries that produced the highest number of publications (5 or more). The top 10 or more countries that produced the highest number of publications were the USA (108), Italy (70), China (60), India (32), England (27), Australia (24), Spain (21), Germany

(16), France (15), Canada (14), Turkey (13) and Brazil (10) respectively.

Active Journals

The 397 publications were published in 79 journals. Of these journals, 24 journals had at least 5 publications about this issue. These top 24 journals that produced the highest number of citations are given in Table 1. The last column of Table 1 demonstrates the total number of citations and the number of citations per publication. The citation visualization map between these journals is demonstrated in Figure 2.

Table 1: Active journals on COVID-19 in Pediatrics

Journals	RC	C	AC
Pediatric Blood & Cancer	27	32	1.19
Lancet Child & Adolescent Health	25	76	3.04
Pediatric Pulmonology	24	110	4.58
Indian Journal of Pediatrics	22	66	3
World Journal of Pediatrics	18	207	11.5
Acta Paediatrica	17	84	4.94
Indian Pediatrics	17	6	0.35
American Journal of Perinatology	16	28	1.75
Journal of Paediatrics and Child Health	14	11	0.79
Pediatric Research	13	8	0.62
Frontiers in Pediatrics	10	30	3
Journal of Human Lactation	9	10	1.11
European Journal of Pediatrics	9	4	0.44
Journal of Perinatal Medicine	8	1	0.13
Monatsschrift Kinderheilkunde	8	0	0
Pediatric Infectious Disease Journal	7	32	4.57
Pediatric Radiology	7	22	3.14
Developmental Medicine and Child Neurology	7	6	0.86
Early Human Development	7	4	0.57
Pediatric Allergy and Immunology	6	8	1.33
Italian Journal of Pediatrics	6	2	0.33
Clinical Pediatrics	5	4	0.8
Pediatric Dermatology	5	2	0.4
Pediatric Allergy Immunology and Pulmonology	5	0	0

RC: Record Count, C: Number of Citation, AC: Average Citation Per Document

Citation Analysis

Table 2 displays the top-cited 15 articles and the total number of citations they received.

Table 2: The 15 most cited manuscripts on COVID-19 in Pediatrics

No	Article	Author	Journal	TC
1	Clinical analysis of 10 neonates born to mothers with 2019-nCoV pneumonia	Zhu H et al.	Translational Pediatrics	133
2	Clinical and CT features in pediatric patients with COVID-19 infection: Different points from adults	Xia W et al.	Pediatric Pulmonology	74
3	Systematic review of COVID-19 in children shows milder cases and a better prognosis than adults	Ludvigsson JF et al.	Acta Paediatrica	61
4	A Review of coronavirus disease-2019 (COVID-19)	Singhal T et al.	Indian Journal of Pediatrics	59
5	Diagnosis, treatment, and prevention of 2019 novel coronavirus infection in children: experts' consensus statement	Shen K et al.	World Journal of Pediatrics	55
6	Diagnosis and treatment recommendations for pediatric respiratory infection caused by the 2019 novel coronavirus	Chen ZM et al.	World Journal of Pediatrics	49
7	Clinical features of severe pediatric patients with coronavirus disease 2019 in Wuhan: a single center's observational study	Sun D et al.	World Journal of Pediatrics	47
8	Coronavirus infections in children including COVID-19 an overview of the epidemiology, clinical features, diagnosis, treatment and prevention options in children	Zimmermann P et al.	Pediatric Infectious Disease Journal	27
9	Clinical features of pediatric patients with COVID-19: a report of two family cluster cases	Ji LN et al.	World Journal of Pediatrics	26
10	Infants born to mothers with a new coronavirus (COVID-19)	Chen Y et al.	Frontiers in Pediatrics	25
11	Clinical characteristics of novel coronavirus disease 2019 (COVID-19) in newborns, infants and children	Hong H et al.	Pediatrics and Neonatology	22
12	Chest computed tomography in children with COVID-19 respiratory infection	Li W et al.	Pediatric Radiology	22
13	Characteristics and outcomes of coronavirus infection in children: the role of viral factors and an immunocompromised state	Ogimi C et al.	Journal of the Pediatric Infectious Diseases Society	21
14	Why is COVID-19 so mild in children?	Brodin P et al.	Acta Paediatrica	20
15	Delayed access or provision of care in Italy resulting from fear of COVID-19	Lazzerini M et al.	Lancet Child & Adolescent Health	15

TC: Total citation

Co-Citation Analysis

The references sections of the 379 publications were found to cite 4231 publications. Figure 3 displays the density map between the 32 publications that had 15 and more citations. The top 5 publications with top co-citation included Yuanyuan (2020) (Number of citations:82), Huang (2020) (55), Lu (2020) (55), Chen (2020) (53), and Zhu (2020) (44) respectively (14-18).

Trend Topics

There were 416 different keywords used in the 397 publications. The network visualization of the cluster analysis performed with 34 keywords used in 3 different articles is demonstrated in Figure 4. These keywords are also presented in Table 3.

Table 3: The first trend keywords on COVID-19 in Pediatrics

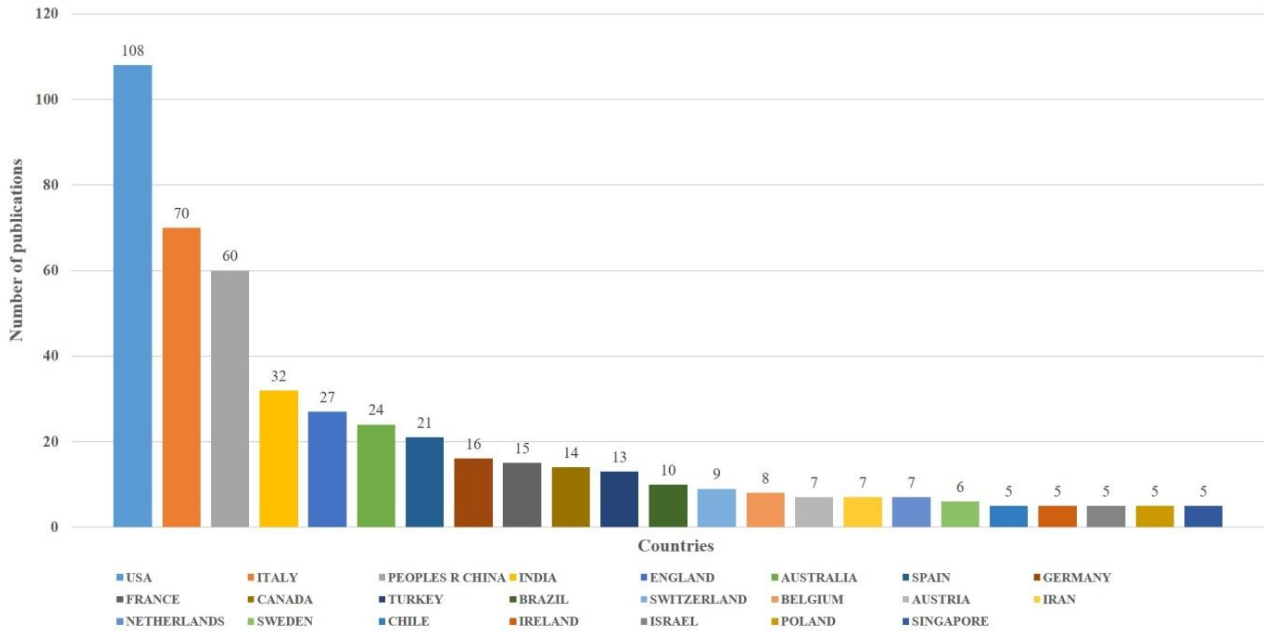| Keyword	O	Keyword	O
covid-19	116	pneumonia	5
sars-cov-2	60	vertical transmission	5
coronavirus	48	Italy	4
children	31	management	4
pandemic	25	novel coronavirus	4
pediatric(s)	17	severe acute respiratory syndrome coronavirus 2	4
pregnancy	13	asthma	3
neonate(s)	12	breast milk	3
child	9	clinical characteristics	3
2019-ncov	8	computed tomography	3
newborn(s)	8	diagnosis	3
adolescents	7	epidemic	3
breastfeeding	6	human milk	3
treatment	6	infant	3
coronavirus disease 2019	5	myocarditis	3
epidemiology	5	survey	3
outbreak	5	symptoms	3

O: Number of occurrences

Figure 1: Countries with the highest number of publications on COVID-19 in the field of Pediatrics
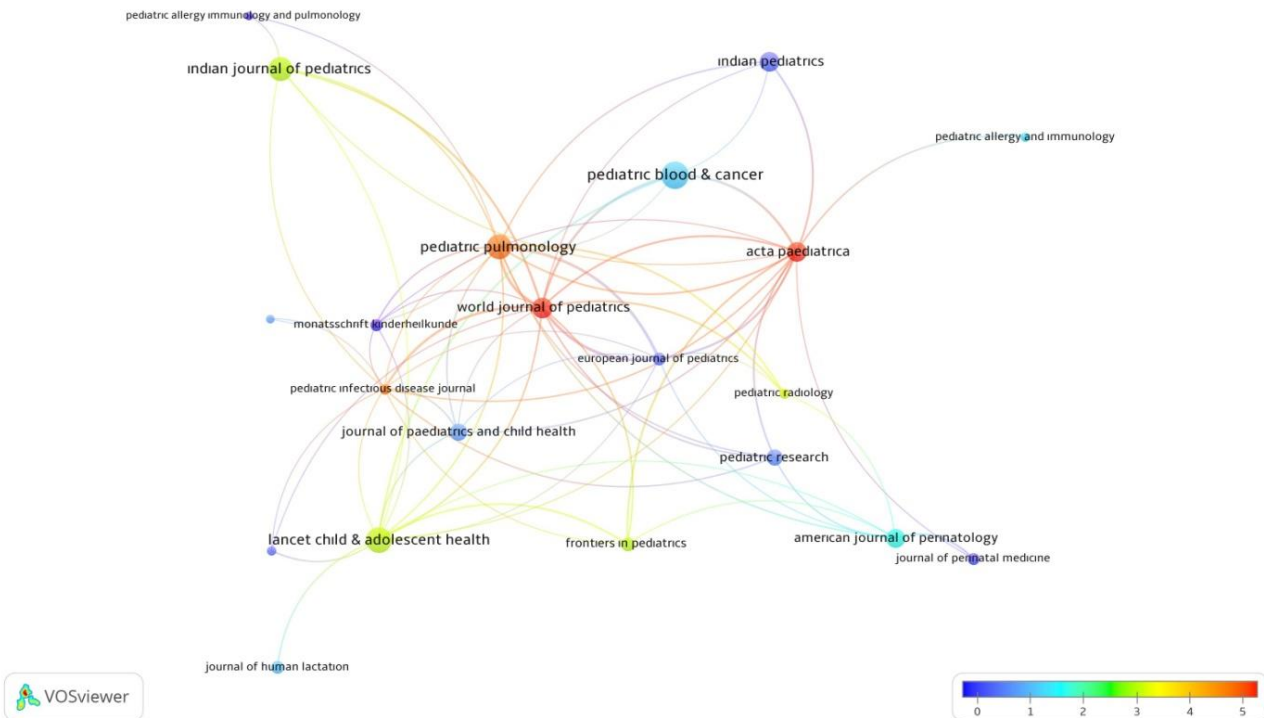

Figure 2: Network visualization map for citation analysis of active journals on COVID-19 in the field of Pediatrics
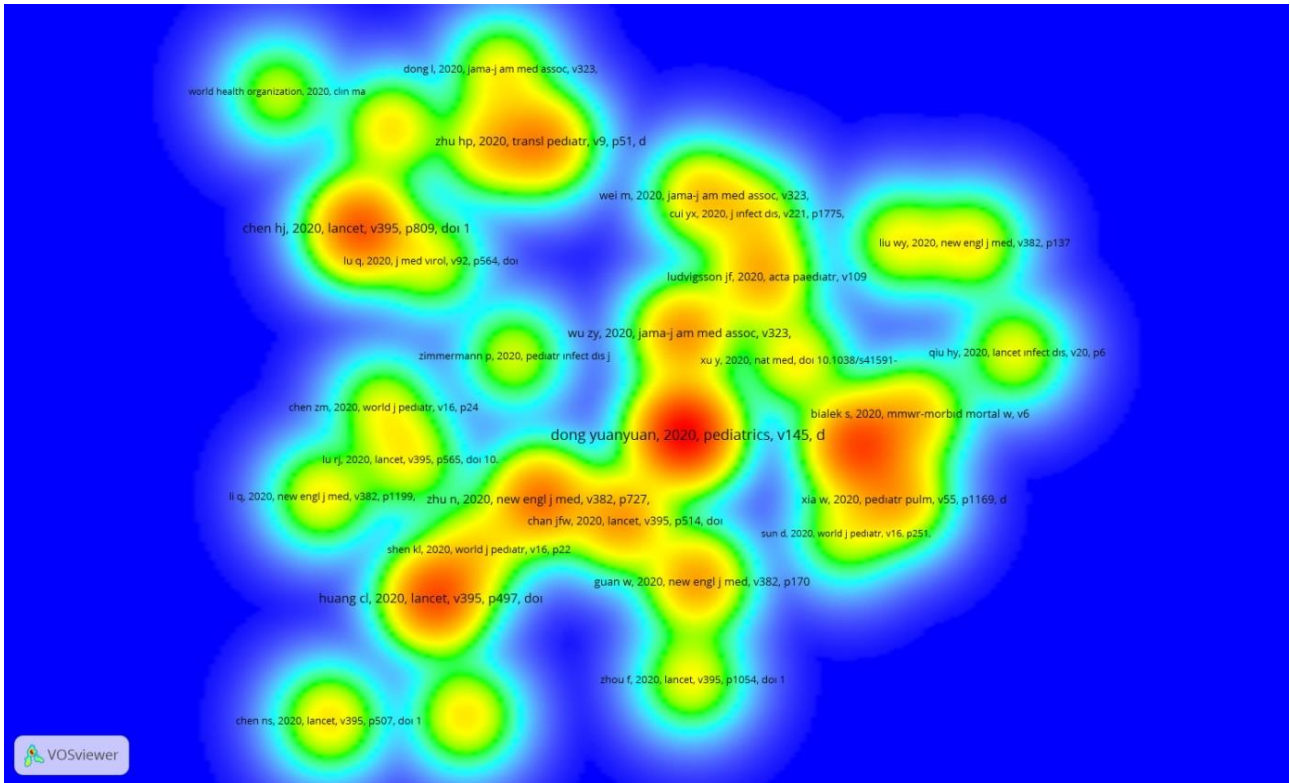Footnote: The number of average citations from blue to red (blue-green-yellow-red) increases.

Figure 3: Density map for co-citation analysis on COVID-19 in the field of Pediatrics Footnote: The number of citations received by the publication increasing from blue to red (blue-green-yellow-red).
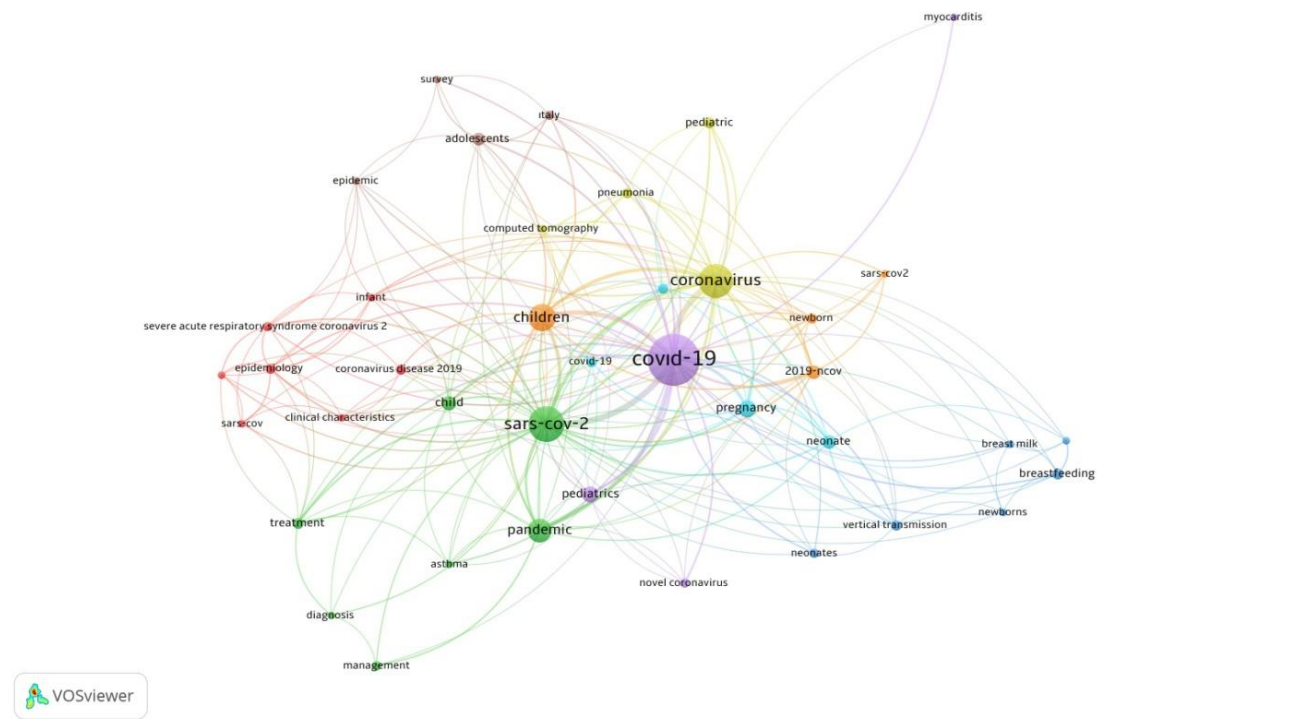

Figure 4: Network visualization cluster map for keyword analysis on COVID-19 in the field of Pediatrics Footnote: Colors indicate clustering. The size of the circles indicates that the keyword is used frequently. The thickness of the lines indicates the strength of relationship.

DISCUSSION

The top 5 journals that had the highest number of publications were Pediatric Blood & Cancer, Lancet Child & Adolescent Health, Pediatric Pulmonology, Indian Journal of Pediatrics, and World Journal of Pediatrics. The top-cited 5 articles were published in the journals of Translational Pediatrics, Pediatric Pulmonology, Acta Paediatrica, Indian Journal of Pediatrics, and World Journal of Pediatrics. Authors to produce publications in this topic might initially consider these journals.

The top-cited article was the study entitled "Clinical analysis of 10 neonates born to mothers with 2019-nCoV pneumonia" written by Zhu H et al. (2020) and published in the Translational Pediatrics (19). The second top-cited study was conducted by Xia W et al. (2020) and published in Pediatric Pulmonology with the title of "Clinical and CT features in pediatric patients with COVID-19 infection: Different points from adults" (20). These studies were followed by Ludvigsson (2020) Singhal (2020) and Shen (2020) respectively (21-23). The studies that had the highest number of co-citations in the articles analyzed were the studies conducted by Yuanyuan (2020), Huang (2020), Lu (2020), Chen (2020), and Zhu (2020) (14-18). Researchers and clinicians interested in this topic are recommended to initially read these publications.

An analysis of the keywords analysis findings indicated 8 different colors of clusters. According to the trend analysis results, the trend topics included the keywords such as pregnancy, neonate(s), newborn(s), adolescents, breastfeeding, treatment, epidemiology, pneumonia, vertical transmission, asthma, breast milk, clinical characteristics, computed tomography, diagnosis, human milk, infant, myocarditis, survey, and symptoms.

Not using databases such as PubMed and Scopus could be considered as a limitation of the present study. As the WoS database indexes articles in the journals with higher impact levels, it is utilized in bibliometric analyses more commonly (6,8).

The pandemic affecting the whole world has also changed the course of academic publications. This bibliometric study provided a summary of the publications about COVID-19 in the field of Pediatrics. The study demonstrated the active journals, top-cited articles, and the trend topics about this topic. Researchers could review these findings and plan new studies about COVID-19. This study could be a guide to researchers and clinicians in the field of Pediatrics by providing a summary of the studies on COVID-19 published so far.

REFERENCES

1. Jiatong S, Wenjun L. Epidemiological characteristics and prevention and control measures of Corona Virus Disease 2019 in children. J Trop Med. 2020;20(2):153-56.

2. Hui DS, I Azhar E, Madani TA, Ntoumi F, Kock R, Osman Dar O et al. The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health-The latest 2019 novel coronavirus outbreak in Wuhan, China. Int J Infect Dis. 2020;91:264–66.

3. Tezer H, Demirdağ BT. Novel coronavirus disease (COVID-19) in children. Turk J Med Sci. 2020;50(3):592–603.

4. Hong H, Wang Y, Chung HT, Chen CJ. Clinical Characteristics of Novel Coronavirus Disease 2019 (COVID-19) in Newborns, Infants and Children. Pediatr Neonatol. 2020;61(2):131-2.

5. Choi SH, Kim HW, Kang JM, Kim DH, Cho EY. Epidemiology and Clinical Features of Coronavirus Disease 2019 in Children. Clin Exp Pediatr. 2020;63(4):125-32.

6. Kiraz M, Demir E. A bibliometric analysis of publications on spinal cord injury during 1980-2018. World Neurosurg. 2020;136:e504-e513.

7. Doğan G. Kayır S. Global Scientific Outputs of Brain Death Publications and Evaluation According to the Religions of Countries. J Relig Health. 2020;59(1):96-112.

8. Demir E, Akmeşe ÖF, Erbay H, Taylan-Özkan A, Mumcuoğlu KY. Bibliometric analysis of publications on house dust mites during 1980-2018. Allergol Immunopathol (Madr). 2020;48(4):374-83.

9. Demir E, Yaşar E, Özkoçak V, Yıldırım E. The evolution of the field of legal medicine: A holistic investigation of global outputs with bibliometric analysis. J Forensic Leg Med. 2020;69:101885.

10. Doğan G, İpek H. The Development of Necrotizing Enterocolitis Publications: A Holistic Evolution of Global Literature with Bibliometric Analysis. Eur J Pediatr Surg. 2020;30(3):293-303.

11. Doğan, G. The Effect of Religious Beliefs on the Publication Productivity of Countries in Circumcision: A Comprehensive Bibliometric View. J Relig Health. 2020;59(2):1126-1136. 12. Demir E, Comba A. The Evolution of Celiac Disease Publications: A Holistic Approach with Bibliometric Analysis. Ir J Med Sci. 2020;189(1):267-76.

12. Van Eck NJ, and Waltman L. Software survey: VOSviewer, a computer program for bibliometric mapping. Scientometrics. 2010;84:523-38.

13. Dong Y, Mo X, Hu Y, Qi X, Jiang F, Jiang Z et al. Epidemiological characteristics of 2143 pediatric patients with 2019 coronavirus disease in China. Pediatrics. 2020; doi: 10.1542/peds.2020-0702.

14. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020;395(10223):497-506.

15. Lu X, Zhang L, Du H, Zhang J, Li YY, Qu J et al. SARS-CoV-2 Infection in Children. N Engl J Med. 2020;382:1663-65.

16. Chen H, Guo J, Wang C, Lou F, Yu X, Zhang W et al. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. Lancet. 2020;395(10226), 809-15.

17. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J et al. A novel coronavirus from patients with pneumonia in China, 2019. N Engl J Med. 2020;382(8),727-33.

18. Zhu H, Wang L, Fang C, Peng S, Zhang L, Chang G et al. Clinical analysis of 10 neonates born to mothers with 2019-nCoV pneumonia. Transl Pediatr. 2020;9(1):51-60.

19. Xia W, Shao J, Guo Y, Peng X, Li Z, Hu D. Clinical and CT features in pediatric patients with COVID-19 infection: Different points from adults. Pediatr Pulmonol. 2020;55(5),1169-74.

20. Ludvigsson, JF. Systematic review of COVID-19 in children shows milder cases and a better prognosis than adults. Acta Paediatr. 2020;109(6):1088-95.

21. Singhal T. A Review of Coronavirus Disease-2019 (COVID-19). Indian J Pediatr. 2020;87(4):281-6.

22. Shen K, Yang Y, Wang T, Zhao D, Jiang Y, Jin R et al. Diagnosis, treatment, and prevention of 2019 novel coronavirus infection in children: experts' consensus statement. World J Pediatr. 2020;16(3):223-31.