IJBCS
ISSN: 2147-1428

Original Article

International Journal of Basic and Clinical Studies, Borcak D *et al*., Volume 12, 2023, 12202

Altmetric Analysis of The Most Cited 100 Articles on COVID-19 Infection in Children

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Abstract

Purpose: Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) infections among children cause less severe illness and fewer deaths as compared to adults. There has been a significant increase in academic research on COVID-19 during the pandemic period. Altmetric analysis is a method for measuring the social impact of academic publications. In this study, the top 100 publications on COVID-19 in children with highest Altmetric Attention Scores were analysed to guide researchers in the COVID-19 pandemic.

Material and Methods: We found the 100 top-cited articles (T100) list from the Web of Science database among 4535 COVID-19 in children articles. Journal title, author name, publication year and Altmetric Attention Scores were examined. The altmetric attention scores were taken from the Altmetric.com website. Bibliometric maps were created using VOSviewer software.

Results: We found 103750 publications with the search term "COVID- 19" in the Web of Science analysis.After the term "children" was added, the total number of publications decreased to 4535. There were 62 original articles, 15 review articles, 12 editorials and 11 letters in the T100 list. The T100 list included 62 original articles, 15 review articles, 12 editorials, and 11 letters.

On Twitter, T100 list articles were shared 94 times. The most cited article "Epidemiology of COVID-19 Among Children in China" by Dong et al's was published in the Pediatrics journal.

Conclusion: This study provides valuable information about research topics in the context of COVID-19 in children and their impact on the academic literature and social media. We contributed to the distribution of scientific knowledge regarding COVID-19 in children via digital media in our study, guided researchers, and gave recommendations for future investigations.

Keywords: COVID- 19; SARS-Cov-2; children; social media; bibliometric analysis

Introduction

Children infected with Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) during the early phases of the COVID-19 pandemic represented up to 2 % of laboratory verified infections (1). 90 % of SARS-CoV-2 positive children generally stay "asymptomatic" or have mild to moderate clinical course (2). In children, COVID-19 presents with a variety of clinical manifestationsChildren have a lower mortality rate from serious or critical disease than adults (3,4). The COVID-19 pandemic has led to an increase in research across all medical specialties, including paediatrics. Because of the increased amount of articles, choosing and reading an article based on its effect is especially crucial for people who do not have time to read all of the related articles.

The most frequent metrics used to evaluate the value of a publication is its citation count. Impact factor (IF), which is determined by the number of publications and citations to the articles in the journals, is used to assess the quality of scientific journals (5). The number of citations to the research and the journal impact factors are insufficient to determine the article's capacity to reach a large audience (6). A statistical method called bibliometric analysis has been used to quantify and analyse the impact of academic literature on clinical practise across time (7). Bibliometric and altmetric studies give valuable and distinct insights on research papers in both the scientific world and community. Nowadays, social media is being utilised to distribute the contents of scientific studies.

The Altmetric scoring system has recently been developed to evaluate the impact of academic papers on social media (8). This automated system, which is used in the media, counts the number of citations an article receives across various media databases. Furthermore, the Altmetric score shows the online attention for articles in news outlets, blog comments, number of tweets, and mentions on social media. Citations require a lot of time to gather, but altmetrics eliminate time-dependent citation disadvantage and use a classical mathematical method to quantify social media involvement (9). The amount of these citations defines an article's total Altmetric score, which is represented by the altmetric donut. Different media sources are indicated by the various colours in the altmetric donut, and the altmetric score is in the middle. The color of the source data that gives the study the highest score takes up more area in the donut. (for example, red is always news, yellow is always blogs) (Figure 1) (10).

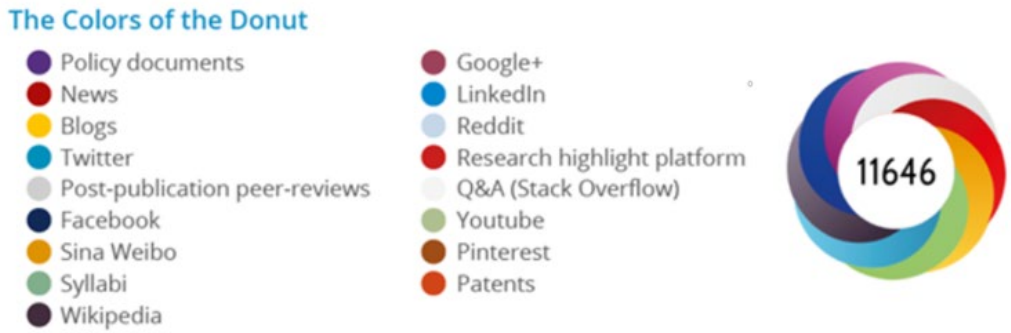

Figure 1. Altmetric donuts

The objective of this study is to examine the most mentioned publications related to COVID-19 in children based on their social attention scores (Table 1). Although there are many studies about COVID-19 in children, there has previously been no study on COVID-19 in children that provides a detailed statistical examination of the relationship between altmetrics and standard bibliometrics. Furthermore, we wanted to see how Twitter influenced these measures in terms of scientific information distribution.

IJBCS ISSN: 2147-1428

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Table 1. The most cited articles about COVID 19 in children

rank	Title	First Author	Publication Year	AAS	TCN	ACpY	NT
1	Epidemiology of COVID-19 Among Children in China	Dong, Yuanyuan	2020	7220	1101	550,5	5005
2	SARS-CoV-2 Infection in Children	Lu, Xiaoxia	2020	5852	765	382,5	11006
3	Hyperinflammatory shock in children during COVID-19 pandemic	Riphagen, Shelley	2020	2394	530	265	1048
4	Coronavirus Disease 2019 in Children - United States, February 12-April 2, 2020	Bialek, Stephanie	2020	4845	470	235	1897
5	Clinical and epidemiological features of 36 children with coronavirus disease 2019 (COVID-19) in Zhejiang, China: an observational cohort study	Qiu, Haiyan	2020	1225	357	178,5	899
6	Multisystem Inflammatory Syndrome in US Children and Adolescents	Feldstein, Leora R	2020	2664	344	172	1868
7	Clinical and CT features in pediatric patients with COVID-19 infection: Different points from adults	Xia, Wei	2020	301	330	165	303
8	Neonatal Early-Onset Infection With SARS-CoV-2 in 33 Neonates Born to Mothers With COVID-19 in Wuhan, China	Zeng, Lingkong	2020	1943	315	157,5	975
9	Review article: gastrointestinal features in COVID-19 and the possibility of faecal transmission	Tian, Yuan	2020	284	253	126,5	60
10	Detection of Covid-19 in Children in Early January 2020 in Wuhan, China	Liu, Weiyong	2020	1579	237	118,5	1997
11	Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Infection in Children and Adolescents A Systematic Review	Castagnoli, Riccardo	2020	1179	230	115	710
12	Kawasaki-like multisystem inflammatory syndrome in children during the covid-19 pandemic in Paris, France: prospective observational study	Toubiana, Julie	2020	832	218	109	804
13	Clinical features of severe pediatric patients with coronavirus disease 2019 in Wuhan: a single center's observational study	Sun, Dan	2020	22	199	99,5	28
14	Multisystem Inflammatory Syndrome in Children in New York State	Dufort, Elizabeth M.	2020	1469	193	96,5	862
15	Age-dependent effects in the transmission and control of COVID-19 epidemics	Davies, Nicholas G.	2020	4415	191	95,5	2371
16	Acute Heart Failure in Multisystem Inflammatory Syndrome in Children in the Context of Global SARS-CoV-2 Pandemic	Belhadjer, Zahra	2020	1145	188	94	1279
17	Children with Covid-19 in Pediatric Emergency Departments in Italy	Parri, Niccolo	2020	582	188	94	673
18	Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling study	Roberton, Timothy	2020	2674	179	89,5	2015
19	Characteristics and Outcomes of Children With Coronavirus Disease 2019 (COVID-19) Infection Admitted to US and Canadian Pediatric Intensive Care Units	Shekerdemian, Lara S.	2020	2205	167	83,5	1594
20	A Case Report of Neonatal 2019 Coronavirus Disease in China	Wang, Shaoshuai	2020	271	160	80	254
21	COVID-19, school closures, and child poverty: a social crisis in the making	Van Lancker,	2020	568	157	78,5	309
22	COVID-19 in children and adolescents in Europe: a multinational, multicentre cohort study	Goetzinger, Florian	2020	2896	154	77	2005
23	Are children less susceptible to COVID-19?	Lee, Ping-Ing	2020	85	151	75,5	65
24	Challenges and burden of the Coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health: a narrative review to highlight clinical and research needs in the acute phase and the long return to normality	Fegert, Joerg M.	2020	114	141	70,5	22
25	Coronavirus disease (COVID-19) and neonate: What neonatologist need to know	Lu, Qi; Shi, Yuan	2020	64	134	67	54
26	Clinical and CT imaging features of the COVID-19 pneumonia: Focus on pregnant women and children	Liu, Huanhuan	2020	37	126	63	11
27	Screening and Severity of Coronavirus Disease 2019 (COVID-19) in Children in Madrid, Spain	Tagarro, Alfredo	2021	703	123	123	640
28	Behavioral and Emotional Disorders in Children during the COVID-19 Epidemic	Jiao, Wen Yan	2020	155	123	61,5	85
29	Clinical Characteristics of Children with Coronavirus Disease 2019 in Hubei, China	Zheng, Fang	2020	29	123	61,5	15
30	The different clinical characteristics of corona virus disease cases between children and their families in China - the character of children with COVID-19	Su, Liang	2020	46	117	58,5	15
31	Multisystem Inflammatory Syndrome Related to COVID-19 in Previously Healthy Children and Adolescents in New York City	Cheung, Eva W.	2020	763	113	56,5	2410

32	COVID-19 epidemic: Disease characteristics in children	She, Jiatong	2020	47	112	56	33
33	Multisystem Inflammatory Syndrome in Children During the Coronavirus 2019 Pandemic: A Case Series	Chiotos, Kathleen	2020	106	111	55,5	63
34	Clinical characteristics of novel coronavirus disease 2019 (COVID-19) in newborns, infants and children	Hong, Hao	2020	36	100	50	22
35	Why is COVID-19 so mild in children?	Brodin, Petter	2020	130	99	49,5	93
36	Chest computed tomography in children with COVID-19 respiratory infection	Li, Wei	2020	26	94	47	30
37	Epidemiology, Clinical Features, and Disease Severity in Patients With Coronavirus Disease 2019 (COVID-19) in a Children's Hospital in New York City, New York	Zachariah, Philip	2020	408	92	46	362
38	Paediatric multisystem inflammatory syndrome temporally associated with SARS-CoV-2 mimicking Kawasaki disease (Kawa-COVID-19): a multicentre cohort	Pouletty, Marie	2020	105	90	45	140
39	A 55-Day-Old Female Infant Infected With 2019 Novel Coronavirus Disease: Presenting With Pneumonia, Liver Injury, and Heart Damage	Cui, Yuxia	2020	75	88	44	93
40	SARS-CoV-2 endothelial infection causes COVID-19 chilblains: histopathological, immunohistochemical and ultrastructural study of seven paediatric cases	Colmenero, I.	2020	1457	87	43,5	821
41	Prolonged viral shedding in feces of pediatric patients with coronavirus disease 2019	Xing, Yu-Han	2020	130	82	41	61
42	COVID-19 in Children: Initial Characterization of the Pediatric Disease	Cruz, Andrea T.	2020	1532	76	38	888
43	Laboratory abnormalities in children with novel coronavirus disease 2019	Henry, Brandon Michael	2020	15	74	37	10
44	COVID-19-Associated Multisystem Inflammatory Syndrome in Children - United States, March-July 2020	Godfred-Cato, Shana	2020	2150	73	36,5	1609
45	SARS-COV-2 infection in children and newborns: a systematic review	Liguoro, Ilaria	2020	93	72	36	34
46	Clinical Characteristics and Outcomes of Hospitalized and Critically Ill Children and Adolescents with Coronavirus Disease 2019 at a Tertiary Care Medical Center in New York City	Chao, Jerry Y	2020	460	71	35,5	136
47	Detectable SARS-CoV-2 viral RNA in feces of three children during recovery period of COVID-19 pneumonia	Zhang, Tongqiang	2020	156	71	35,5	22
48	Novel coronavirus in a 15-day-old neonate with clinical signs of sepsis, a case report	Aghdam, Mojtaba Kamali	2020	7	68	34	1
49	COVID-19 in Children, Pregnancy and Neonates: A Review of Epidemiologic and Clinical Features	Zimmermann, Petra	2020	969	67	33,5	23
50	COVID-19 in children: the link in the transmission chain	Kelvin, Alyson A.	2020	674	66	33	678
51	Clinical features of pediatric patients with COVID-19: a report of two family cluster cases	Ji, Li-Na	2020	3	65	32,5	6
52	Acute myocarditis and multisystem inflammatory emerging disease following SARS-CoV-2 infection in critically ill children	Grimaud, Marion	2020	20	64	32	30
53	Chilblains in children in the setting of COVID-19 pandemic	Andina, David	2020	157	60	30	167
54	Updated diagnosis, treatment and prevention of COVID-19 in children: experts' consensus statement (condensed version of the second edition)	Shen, Kun-Ling; Gao, Li-Wei; Wang, Yong-Yan; Wang, Xue-Feng	2020	16	59	29,5	25
55	COVID-19 Infection and Circulating ACE2 Levels: Protective Role in Women and Children	Ciaglia, Elena; Vecchione, Carmine; Puca, Annibale Alessandro	2020	68	59	29,5	92
56	Understanding SARS-CoV-2-related multisystem inflammatory syndrome in children	Rowley, Anne H.	2020	323	58	29	415
57	Hospitalization Rates and Characteristics of Children Aged < 18 Years Hospitalized with Laboratory-Confirmed COVID-19-COVID-NET, 14 States, March 1-July 25, 2020	Kim, Lindsay	2020	4388	57	28,5	4281
58	Paediatric Inflammatory Multisystem Syndrome: Temporally Associated with SARS-CoV-2 (PIMS-TS): Cardiac Features, Management and Short-Term Outcomes at a UK Tertiary Paediatric Hospital	Ramcharan, Tristan	2020	22	57	28,5	31
59	COVID-19 and multisystem inflammatory syndrome in children and adolescents	Jiang, Li	2020	435	54	27	676
60	Autoimmune and inflammatory diseases following COVID-19	Galeotti, Caroline	2020	243	53	26,5	325

61	Clinical characteristics of children and young people admitted to hospital with covid-19 in United Kingdom: prospective multicentre observational cohort study	Swann, Olivia, V.	2020	2657	52	26	2838
62	Flash survey on severe acute respiratory syndrome coronavirus-2 infections in paediatric patients on anticancer treatment	Hrusak, Ondrej	2020	12	52	26	18
63	COVID-19 in Children and the Dynamics of Infection in Families	Posfay-Barbe	2020	1117	51	25,5	458
64	Coinfection and Other Clinical Characteristics of COVID-19 in Children	Wu, Qin	2020	228	50	25	120
65	The Immunology of Multisystem Inflammatory Syndrome in Children with COVID-19	Consiglio, Camila Rosat	2020	1217	49	24,5	1496
66	COVID-19 infection in children	Sinha, Ian P.	2020	270	49	24,5	295
67	Early advice on managing children with cancer during the COVID-19 pandemic and a call for sharing experiences	Bouffet, Eric	2020	53	48	24	54
68	Children are not COVID-19 super spreaders: time to go back to school	Munro, Alasdair P.	2020	3998	47	23,5	4999
69	Neurologic manifestations in an infant with COVID-19	Dugue, Rachelle	2020	35	46	23	42
70	Pathophysiology of COVID-19: Why Children Fare Better than Adults?	Dhochak, Nitin	2020	29	46	23	16
71	Neurologic and Radiographic Findings Associated With COVID-19 Infection in Children	Abdel-Mannan	2020	954	45	22,5	847
72	COVID-19 in Children With Cancer in New York City	Boulad, Farid	2020	463	44	22	158
73	CT features of novel coronavirus pneumonia (COVID-19) in children	Duan, Ya-ni	2020	13	43	21,5	21
74	Clinical characteristics and diagnostic challenges of pediatric COVID-19: A systematic review and meta-analysis	Chang, Tu-Hsuan	2020	13	42	21	6
75	First Pediatric Case of Coronavirus Disease 2019 in Korea	Park, Ji Young	2020	37	42	21	34
76	Pediatric Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2): Clinical Presentation, Infectivity, and Immune Responses	Yonker, Lael M.	2020	7747	41	20,5	10099
77	Multisystem inflammatory syndrome in children and COVID-19 are distinct presentations of SARS CoV-2	Diorio, Caroline	2020	174	41	20,5	62
78	Encephalitis Associated with COVID-19 Infection in an 11-Year-Old Child	McAbee, Gary N.	2020	6	41	20,5	7
79	Multi-System Inflammatory Syndrome in Children (MIS-C) Following SARS-CoV-2 Infection: Review of Clinical Presentation, Hypothetical Pathogenesis, and Proposed Management	Nakra, Natasha A.	2020	44	41	20,5	35
80	Children are unlikely to be the main drivers of the COVID-19 pandemic - A systematic review	Ludvigsson, Jonas F.	2020	1064	41	20,5	1214
81	Multisystem inflammatory syndrome in children related to COVID-19: A New York City experience	Riollano-Cruz	2021	61	38	19	33
82	LUNG ULTRASOUND IN CHILDREN WITH COVID-19: PRELIMINARY FINDINGS	Musolino, Anna Maria	2020	6	38	19	11
83	Pediatric Airway Management in COVID-19 Patients: Consensus Guidelines From the Society for Pediatric Anesthesia's Pediatric Difficult Intubation Collaborative and the Canadian Pediatric Anesthesia Society	Matava, Clyde T.	2020	140	38	19	189
84	Novel coronavirus infection in children outside of Wuhan, China	Shen, Qinxue	2020	43	37	18,5	6
85	Distinct clinical and immunological features of SARS-CoV-2-induced multisystem inflammatory syndrome in children	Lee, Pui Y.	2020	16	36	18	26
86	No evidence of secondary transmission of COVID-19 from children attending school in Ireland, 2020	Heavey, Laura	2020	2799	36	18	3156
87	Impact of COVID-19 and lockdown on mental health of children and adolescents: A narrative review with recommendations	Singh, Shweta	2020	856	35	17,5	645
88	Viral RNA Load in Mildly Symptomatic and Asymptomatic Children with COVID-19, Seoul, South Korea	Han, Mi Seon	2020	245	35	17,5	214
89	Multisystem Inflammatory Syndrome with Features of Atypical Kawasaki Disease during COVID-19 Pandemic	Rauf, Abdul	2020	3	35	17,5	0
90	Multicenter Initial Guidance on Use of Antivirals for Children With Coronavirus Disease 2019/Severe Acute Respiratory Syndrome Coronavirus 2	Chiotos, Kathleen	2020	119	34	17	174
91	Gastrointestinal Symptoms as a Major Presentation Component of a Novel Multisystem Inflammatory Syndrome in Children That Is Related to Coronavirus Disease 2019: A Single Center Experience of 44 Cases	Miller, Jonathan	2020	25	34	17	19
92	A clinical, histopathological and laboratory study of 19 consecutive Italian paediatric patients with chilblain-like lesions: lights and shadows on the relationship with COVID-19 infection	El Hachem, M.	2020	32	34	17	0

93	Corona Virus Disease 2019 and Paediatric Inflammatory Bowel Diseases: Global Experience and Provisional Guidance (March 2020) from the Paediatric IBD Porto Group of European Society of Paediatric Gastroenterology, Hepatology, and Nutrition	Turner, Dan	2020	80	34	17	49
94	Features of COVID-19 post-infectious cytokine release syndrome in children presenting to the emergency department	Waltuch, Temima	2020	189	33	16,5	48
95	Pediatric Crohn Disease and Multisystem Inflammatory Syndrome in Children (MIS-C) and COVID-19 Treated With Infliximab	Dolinger, Michael T.	2020	40	33	16,5	40
96	COVID-19 in Children in the United States: Intensive Care Admissions, Estimated Total Infected, and Projected Numbers of Severe Pediatric Cases in 2020	Pathak, Elizabeth Barnett	2020	934	33	16,5	395
97	Clinical and Immune Features of Hospitalized Pediatric Patients With Coronavirus Disease 2019 (COVID-19) in Wuhan, China	Wu, Huan	2020	127	33	16,5	119
98	A single-center, retrospective study of COVID-19 features in children: a descriptive investigation	Ma, Huijing	2020	111	33	16,5	151
99	SARS-CoV-2 in cardiac tissue of a child with COVID-19-related multisystem inflammatory syndrome	Dolhnikoff, Marisa	2020	2157	32	16	4390
100	Clinical manifestations of children with COVID-19: A systematic review	de Souza, Tiago H.	2020	229	32	16	60

TCN: total citation number; ACpY: average citation per year; AAS: altmetric attention score; NT: number of tweet

Material And Methods

Study Design

In this study, the publications about COVID-19 in children were analyzed using the (WoS) Core Collection database (Philadelphia, Pennsylvania, United States) with key words "COVID-19" and "COVID-19 in children". The data included publications from April 2020 to April 2021. There were no language limitations. Microsoft Excel files were used to collect and evaluate data. Using the Scottish Intercollegiate Guidelines (SIGN 100), the study types and levels of evidence were evaluated (11). The journal IF's were calculated using the 2019 Clarivate Journal Citation Reports. The quartile (Q) scores and H-index of journals were calculated using the 2020 Scimago Journal and Country Rank (Scimago) (12).The VOSviewer programme was used to perform bibliometric analysis and mapping techniques (13). Altmetric attention scores (AAS) were derived from the altmetric.com website (14,15). We also examined the number of Twitter shares that each report received.

This study was approved by the clinical research ethics committee of the Bakirkoy Dr. Sadi Konuk Training and Research Hospital (Date:19.09.2022, number: 2022-18-06).

Statistical Analysis

Descriptive statistics were used to determine meanSD/Median Quarter 1 and 3 for numerical values and number/percentage for categorical data. For comparisons of AAS, total citation number, number of tweets, and size-badges, the Kruskal-Wallis test was performed, and the Dunn test was utilised for posthoc analysis. Spearman or Pearson correlation coefficients were performed to detect a linear relationship between numerical variables. Beta coefficients were estimated by univariate linear regression analysis. Statistical analysis was performed with SPSS software (IBM, version 21). A value of $p<0.05$ was accepted as statistically significant.

Results

This study is a retrospective clinical investigation with level three or group B evidence. In the WOS search, we discovered 103750 studies on COVID-19 and 4535 of the studies were about COVID-19 in children. All of the work in the field of COVID-19 in children were written in English.

Total Citation Number (TCN) and AAS Analysis

Total citations and AAS had median values of 65.5 (32-1101) and 208.5 (3-7747), respectively. The citation numbers were between 1101 and 32 and the AAS ranked between 7747 and 3. Dong et al.'s article “Epidemiology of COVID-19 Between Children in China”, published in the Pediatrics journal became the most cited article with 1101 citations. According to the correlation and regression analysis, the mean dimension badge was 189.22 ± 229.91 (33–1646), and Dong’s article received the most dimension badges. The article with the highest AAS was“Pediatric Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2): Clinical Presentation, Infectivity, and Immune Responses” with 7747 AAS was published in the Journal of Pediatrics(16). The three of the articles with the highest AAS value were among the top 10 articles with the highest citation number.

Twitter Analysis

There were 94 articles shared on Twitter. The most-tweeted article"SARS-CoV-2 Infection in Children"was published in the New England Journal of Medicine, the journal with the highest impact factor (17). Altmetric placed in the top 5 % of all evaluations, receiving 11730 tweets from 10622 individuals and reaching 32331339 followers. 10,622 tweeters who shared this research output were from the United States (19 %), Australia(8%),United Kingdom(5 %), Canada (3%), and Turkey(2%) respectively. The demographicbreakdown was as follows; Members of the public (82%), scientists (9 %), practitioners(doctors, other healthcare professionals) (7%), science communicators (journalists, bloggers,editors), (2 %) unknown.

Journal Perspective

The articles appeared in 68 different journals, with an average of 1 to 5 articles per journal. The Lancet, Jama Pediatrics, and the New England Journal of Medicine printed most of the publications. Pediatrics, New England Journal of Medicine, and The Lancet were the most cited journals, in that order. The journals with most tweeted articles were New England Journal of Medicine, Journal of Pediatrics, and Pediatrics. The journals in which the most tweeted articles published were New England Journal OfÖMedicine, Journal of Pediatrics, and Pediatrics. According to SJCR,79 journals received Q1 scores, 18 journals received Q2 scores and 3 journals received Q3 scores.

Article Types

There were 62 original and 15 review articles, 12 editorials and 11 letters. According to SIGN, 48 articles on the T100 list had evidence level 3 and 43 had evidence level 4.

Research Topics

When we evaluated the T100 list by the main topic, the majority of articles were related to clinical features (n=24), epidemiology (n=18), and multisystem inflammatory syndrome (n=15). The main topics of the top 10 articles with the highest citation numbers were related to clinical features and outcomes (n=5), and epidemiology, (n = 5), while the main topics of the top 10 articles with the highest AASs were about epidemiology (n=6) clinical features and outcomes (n=2), and immunology (n=2).

Distribution of Countries

The 100 top-cited articles were from 40 countries. The countries with the most published articles were the USA with 38 studies, China with 30 studies, and Italy with 15 studies.

Correlation Analysis

The Q category level of the journals had a statistically significant effect on the number of AAS and tweets they received. ($p<0.001$). The AAS values of the articles in Q1 journals 323 (93-1469), were significantly higher than those in Q2 and Q3 journals (40.5 (22- 130), 29 (3 -29)) respectively. Similarly, the number of tweets about articles published in Q1 journals was significantly higher than those in Q2, and Q3 journals. There were no significant differences in the AAS, total citation, dimension, and tweet numbers of studies with different levels of evidence ($p>0.05$).

The AAS numbers of the studies with the main subject epidemiology, pathogenesis, and multisystem inflammatory syndrome were statistically significantly higher than the studies on other subjects ($p<0.05$). There was no significant difference between AAS, total citation, dimension, and tweet numbers of studies according to the main subject of the studies. ($p>0.05$). The correlation between AAS, citation number, average citation per year, journal impact factor, and H-index is shown in Table 2. There was a strong positive correlation between the Altmetric Attention Score and the number of Tweets ($r=0.884$; $p=0.001$). There was a moderate positive correlation between the average citation per year and Tweet ($r=0.451$; $p=0.001$) (Figure 2). According to univariate linear regression analysis ~78% of variation in Altmetrıc Attentıon Score was explained by Number of Tweet. 1 unit increase in Tweet resulted in 0.76 increase in Altmetrıc Attentıon Score model to estimate Altmetrıc Attentıon Score was Y Altmetrıc Attentıon Score = 265.57+0.76*X Number of Tweet There was moderate positive correlation between AAS and Dimension badge ($r=0.623$;$p=0.001$) According to univariate linear regression analysis ~39% of variation inAAS was explained by Dimension badge. 1 unit increase in Dimension badge resulted in4.11 increase in AAS model to estimate AAS was Y AAS = 133.93+4.11*X Dimension badge.

Table 2. Correlation analysis

		1	2	3	4	5	6	7	8	9
1.AAS	r	1								
	p									
2. Number of Tweet	r	0,884**	1							
	p	0,001								
3.Dimension	r	0,623**	0,464**	1						
	p	0,001	0,001							
4.Total Citations	r	0,590**	0,453**	0,993**	1					
	p	0,001	0,001	0,001						
5.Average per Year	r	0,587**	0,451**	0,991**	0,997**	1				
	p	0,001	0,001	0,001	0,001					
6. 2020 Cite	r	0,553**	0,429**	0,980**	0,994**	0,991**	1			
	p	0,001	0,001	0,001	0,001	0,001				
7. 2021 Cite	r	0,660**	0,490**	0,940**	0,926**	0,921**	0,879**	1		
	p	0,001	0,001	0,001	0,001	0,001	0,001			
8. Journal h index	r	0,327**	0,347**	0,418**	0,396**	0,393**	0,359**	0,484**	1	
	p	0,001	0,001	0,001	0,001	0,001	0,001	0,001		
9. Journal impact factor	r	0,346**	0,366**	0,445**	0,420**	0,419**	0,380**	0,518**	0,890**	1
	p	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001	

AAS: Altmetrıc Attention Score
r was obtained from spearman rank or Pearson correlation coefficient, (n=100)
* : p<0.05, ** : p<0.001

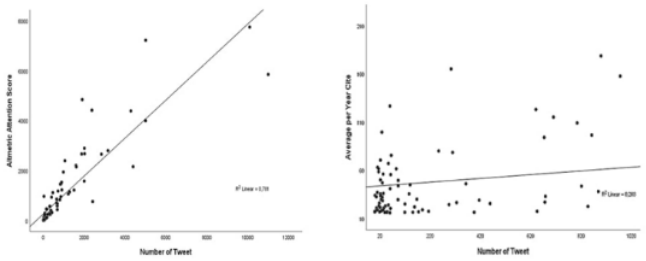

Figure 2. Scatter plot of the relationship between altmetric attention score and number of tweets

Visualization Analysis

A high-frequency keyword co-occurrence analysis was done. The minimal requirement for keyword co-occurrence was determined as 1. The five main clusters were represented by the colors red, green, blue, yellow, and purple, and the network was used to group the appropriate keywords together (Figure 3). "COVID-19" and "children" were the most commonly used keywords. These words have increased awareness of COVID-19 research.

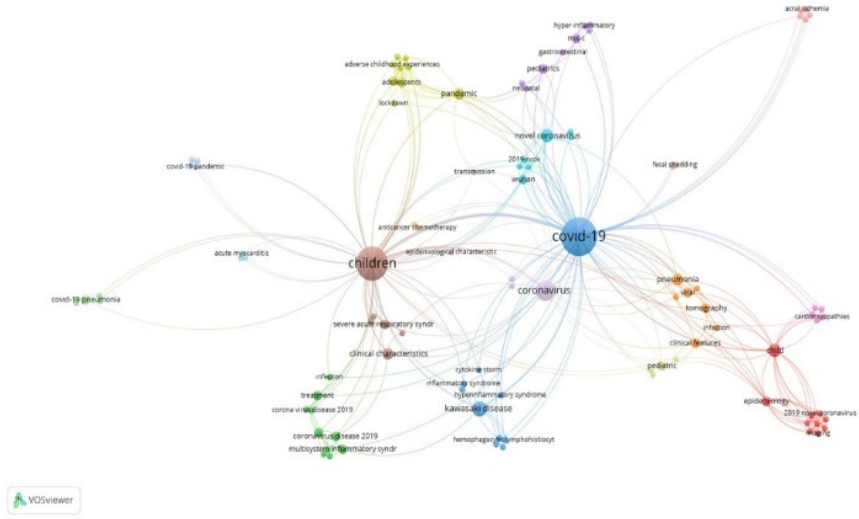

Figure 3. Distribution and intersection points of top 100 cited articles

DISCUSSION

The alternative metrics evaluate the influence of science on social media rather than the impact of science on science. As a result of the pandemic, articles on COVID-19 were promptly accepted and published in journals. The researchers had serious concerns about evidence-based decision making process During the pandemic, this study examined the features of scholarly literature concerning COVID-19 in children.

The altmetric attention scores varied in accordance with the degree of interest in the social media content. In accordance with the previous studies, the AAS values varied between 3 and 7747 with different ranges. Borku et al.(18). found the AAS between 7301 and 34789 in their study and Moon et al. (19). stated AAS values between 7301–34789. Total citation count and AAS were found to be closely correlated like Araujo AC et al.'s study (20). Sometimes there is no correlation between an article's AAS and its citation count. Yonker et al.'s article had 1307 AAS, but only 41 times cited. This might be attributed to the social media's interest in the content of the article.A scientific indicator used in academia that combines publication and citation counts is called the h-index. In our study, we noticed a strong statistical correlation between journal IF and the h index. The h-index also refers to how long an author has been publishing work, in addition to self-citation. Most of the included articles were from the USA and China which is consistent with previous studies (21,22). Developed countries, such as the United States, pay more attention to the issue and provide more funding. If we look at China, it is the country where the COVID-19 epidemic began and spread throughout the world.

Limitations: There were various limitations that could have effected the study's results. As Altmetric is updated daily, a different list might be made depending on the date. A high AAS does not always indicate a high-quality study, as both negative and positive assessments have an equal impact on AAS. Because Altmetric relies on certain media sources, the scientific article's online distribution will be restricted to these platforms. Web of Science was the only

database we used for our research. Nonetheless, this database is among the most often used sources of reliable scientific data. Articles on COVID-19 in children were discovered utilising relevant keywords. As a result, publications containing other terms or words may be overlooked. Despite the fact that study on COVID-19 remains currently in progress, our study only included articles published up until April 2021.

Conclusion

The top 100 cited articles on COVID-19 in children have not been analyzed in an altmetric research previously. The most cited articles were analyzed to identify trends in recent research and offer potential recommendations for further research. Additionally, it offers a perspective on the level of interest that the scientific community has expressed on social media platforms for the most frequently cited articles on COVID-19 in children.

Traditional citation-based metrics are statistics of "scientific effect" on an academic-based community, whereas altmetrics are potential measures of a "disseminative effect" on the normal community(23). Traditional metrics dependent on citations can be supplemented by altmetrics, which comprises the majority of the information from internet postings on social networks. The correlation between aas and citations will strengthen as academic knowledge is shared on social media through time.

Conflict of Interest: The authors declared no conflict of interest.

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