Research Article

Measuring Social Media Attention of Scientific Research on COVID-19: An Investigation on Article-Level Metrics Data of Dimensions

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Abstract
The purpose of this research was to evaluate the effectiveness of scientific productions on COVID-19 in social media for four months. This applied and scientometric study was conducted using the altmetrics approach. The data sources for this study included research papers published about the COVID-19 indexed in the Dimensions platform from December 2019 to March 2020. Approximately, 20% of the data on research articles with the highest citations in addition to 20% of the articles with the highest Altmetric Attention Scores (AASs) including title, journal, citation, and altmetrics indicators was extracted and analyzed by SPSS 16.0. The results showed that 1910 scientific productions about the COVID-19 were indexed in the Dimensions platform. A considerable number of these articles were accessible via preprint services and were published in journals such as The Lancet, JAMA, BMJ, and NEJM. Authors from China and Japan were the most active authors. All 382 articles had AAS, that is, all of these articles received attention, at least in one of the social media articles. The highest and lowest AAS for these articles ranged from 14030 to 6, respectively. These results showed a high rate of attention by researchers and users of social media to the articles presented on COVID-19. The results of this research also showed a significant positive relationship between citations and altmetric indicators. Based on the results, it was concluded that the information provided on COVID-19 was remarkably high. In addition, the result showed that the information demand by social media audiences was also high.

Keywords: COVID-19, Scientific Productivity, Altmetric Analysis, Social Effectiveness

Introduction
In September 2019, the new Coronavirus started to spread pneumonia across Wuhan, China, to the rest of the world. Presently, it is a paramount health threat to the general public. On 12 January 2020, the World Health Organization temporarily named this virus the new Coronavirus 2019 (2019-nCoV). On 11 February 2020, this organization also officially called this disease as "the Coronavirus Disease 2019 (COVID-19)" [1]. The 2019 coronavirus pandemic spread throughout the world and by 22 March 2020, approximately 185 countries were affected by the virus [2]. The worldwide challenge of this disease has resulted in a considerable amount of scientific production to identify different aspects of the disease such as its clinical symptoms, diagnosis, epidemiology, transmission, prevention, control, and treatment.

Counting the citations of the scientific articles to evaluate their impact started in the 1960s; ever since this approach has been used extensively. It seems that the citation alone is not sufficient to cover a wide range of scientific research impacts. For instance, some of the publications not cited may have a significant impact [3]. There are numerous non-writers, including practitioners, general people, and instructors that read research papers and use the results of these articles in such activities as teaching or business [4-6].

Additionally, considering the fact that it takes so many years to receive any citations, the use of this method is relatively slow for evaluation purposes; therefore, scientometrics experts attempt to introduce different indicators that are more realistic to examine the impact of a research article. Recently, Web resources such as social media have been used as a complementary tool for the evaluation of research activities. They may provide a broader range of scientific impact due to their rise in their popularity among people [7]. The interactions of users within social media have the potential to provide valuable data for evaluation [8]. This attribute resulted in the creation of new indicators to assess the impact of papers (both published and unpublished); thus, it led to the emergence of altmetrics.

Therefore, scientometrics experts used the altmetrics approach as one of the means to evaluate and trace the impact of articles on the social web. Since the spread of coronavirus globally and its vicious casualties, researchers all over the world started conducting extensive studies on various aspects of the virus. In this regard, scientometrics researchers found the opportunity to monitor and evaluate the invisible influence of scientific productions in the field of COVID-19 by using the altmetrics indicators such as visits, downloads, bookmarks, favorites, and mention based on social web data. Altmetrics may be useful to track real-time usage of the latest publications, record usage statistics of online resources, find how research reports are used by researchers and the public as well and predicting the future citations. One of the platforms used for altmetrics studies and article impact assessment is the Dimensions platform. This tool provides the access to data related to the presence and attention received by scientific products in different social media such as Twitter, Facebook, YouTube, Policy document, Blog, and News. In addition, the main indicator of Dimension is the Altmetric Attention Score (AAS). The AAS is calculated by summing each indicator multiplied by its weight with necessary adjustments, and the AAS are updated in real-time [9].

It needs to be mentioned that the impact of one article is not just because of its use in writing another article. Any research findings may be used at the patient's bedside or in educational content. It may be compiled by the news or be adopted as policy documents or medical guidelines and so on. The purpose of this study was twofold; first, to identify different types of academic and social effects of publications on COVID-19 and second to examine the significance of correlations between all these influential items. Numerous studies have been conducted to examine the presence or absence of correlations between Citation and Altmetrics indicators; adopting these similar approaches, the present research was designed. Considering the inconsistencies of results, there is a need for further research to determine whether there are any significant correlations between the different indices from different platforms for different subject areas within different countries. Despite the fact that any scientific production may take several years to cite; however, such products may be shared in some social media and attract attention even before it is published in a journal. Therefore, due to the high speed of publication of scientific products of COVID-19 and their significance in determining the unknown dimensions of this disease, this study was designed to evaluate the rate of attention paid to the scientific productions on COVID-19 in social media. For this purpose, the present study investigated the number of indexed articles related to COVID-19 in the Dimension platform from December 2019 to March 2020, the number of citations received per articles and the amount of attention paid to them by the social media audiences to determine the real-time impact of scientific productions on COVID-19.

Research Methodology

The study is applied research in terms of the purpose and sciento-

metrics descriptive in terms of type, which has been done using the library method and the altmetrics approach. The data sources for this study included research papers on the COVID-19 indexed in the Dimensions platform from December 2019 to March 2020. In order to obtain scientific products related to Covid-19, a search was conducted with related keywords in Dimensions. A free version of this platform provides an openly available search across more than 100 million publication records, ranging from articles published in scholarly journals, books, and book chapters to preprints and conference proceedings. Dimensions provide Citation indicators and Altmetric attention scores (AAS) to evaluate the impact of the publications [10].

The study population included publications on the COVID-19 indexed in the Dimensions platform from December 2019 to March 2020. The following keywords were used in the search section of the Dimensions platform within the Title and Abstract fields: "Wuhan corona virus" OR "COVID 19" OR "2019-nCov" OR "COVID-19" OR "coronavirus disease 2019" OR "2019 Novel Coronavirus" OR "2019 nCoV" OR "corona virus disease-19".

The researcher selected 20% of the articles with the highest citation count and 20% of the articles with the highest AAS to analyze. For this purpose, once the articles were sorted by Citations and once by the Altmetric Attention Score. The AAS for an article provided by Altmetric aggregates activities surrounding research outputs in social media. The AAS is derived from the weighted scores of individual indicators such as News, Blogs, Wikipedia pages, Policy Documents, Twitter, Facebook, YouTube, and Reddit by algorithms. The AAS is calculated by summing each indicator multiplied by its weight with necessary adjustments; they are updated in real-time [9]. The information of the first 382 articles in both lists, including article title, year, and journal name was saved in an Excel file. Subsequently, the citation counts, altmetrics indicators (Twitter, Facebook, Reddit, YouTube, Blogs, News, Wikipedia, and YouTube), and AAS for each article were extracted. These data were analyzed by SPSS: PC 16.0. Descriptive and analytic procedures were performed and presented in tables and figures.

Results

The results of the analysis showed that 1910 research papers about COVID-19 were indexed in the Dimension Platform. A considerable number of these articles were accessible via preprint services such as *MedRxiv* (373), *BioRxiv* (117), *ArXiv* (74), *Research Square* (59), *SSRN* (57), and *ChemRxiv* (48). Preprint servers are online archives or repositories that include works or data associated with various scholarly papers that are not yet peer-reviewed or accepted by academic journals. The journals, including Lancet, BMJ, Journal of Medical Virology, NEJM and JAMA were in subsequent rankings. Table 1 presents a list of the most productive authors on the top naming Hiroshi Nishiura from Hokkaido University publishing 16 articles.

Table 1: The Most Productive Authors in the COVID-19 Domain

Author	No. of Article	Affiliation
Hiroshi Nishiura	16	Hokkaido University, Japan
Dai-Hai He	14	Hong Kong Polytechnic University, China
Natalie Marie Linton	13	Hokkaido University, Japan
Andrei R R Akhmetzhanov	13	Hokkaido University, Japan
Yijun Lou	12	Hong Kong Polytechnic University, China

According to Table 1, Only 5 authors published 12 or more articles on Covid-19 in these four months. There were three authors from the Hokkaido University, Japan, and two authors from the Hong Kong Polytechnic University, China.

Twenty percent of the articles with the highest citations (382) and twenty percent of the articles with the highest AAS (382) were examined. A total of 382 articles with the highest citations were published in 110 preprint services. In addition, 382 articles with the highest AAS were published in 377 preprint services or journals. The titles of journals with more than 7 articles are presented in table 2.

Table 2: Journals with More Than 7 Articles in The Field of Covid-19

Articles with the highest citations			Articles with the highest AAS		
preprint server OR journal	Index in:	NO. of Article	preprint server OR journal	Index in:	NO. of Article
MedRxiv preprint server	preprint server	39	MedRxiv	Preprint server	60
BioRxiv	preprint server	35	The Lancet	ISI, Scopus, PubMed	40
The Lancet	ISI, Scopus, PubMed	22	BioRxiv	preprint server	35
Journal of Medical Virology	ISI, Scopus, PubMed	22	JAMA	ISI, Scopus, PubMed	22
Nature Reviews Drug Discovery	ISI, Scopus, PubMed	17	New England Journal of Medicine	ISI, Scopus, PubMed	19
Radiology	ISI, Scopus, PubMed	16	Radiology	ISI, Scopus, PubMed	16
JAMA	ISI, Scopus, PubMed	14	Journal of Medical Virology	ISI, Scopus, PubMed	11
Journal of Clinical Medicine	ISI, Scopus	11	The Lancet Infectious Diseases	ISI, Scopus, PubMed	11
Eurosurveillance	ISI, Scopus, PubMed	11	Eurosurveillance	ISI, Scopus, PubMed	9
Emerging Infectious Diseases	ISI, Scopus, PubMed	7	The BMJ	ISI, Scopus, PubMed	8
The Lancet Infectious Diseases	ISI, Scopus, PubMed	7	Emerging Infectious Diseases	ISI, Scopus, PubMed	7
中华结核和呼吸杂志		7			

The result of the review of the articles with the highest number of citations showed that pre-print services such as MedRxiv and BioRxiv had the highest number of articles with 39 and 35 articles, respectively. Also, the review of articles with the highest AAS showed that MedRxiv published the most articles (60) followed by BioRxiv (35). The result of the journal performance assessment indicated that the journal with the most contributions was the Lancet in both groups of articles with the most citations and the highest AAS (22 and 40, respectively). A visual inspection of table 2 reveals the commonalities of the journals in two categories; all of these journals are indexed in WOS, Scopus, and PubMed.

A total of 382 articles with the highest citations received 5521 citations. The maximum and minimum number of citations was 472 and one, respectively. Nine articles alone made up 40 percent of the citations. The study with the highest citation on Covid-19 was reported in 2020 by Chaolin Huang, et al. published in "the Lancet" entitled "Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China" with 472 citations and 10904 AASs (Table 3).

Table 3: Articles with 40 Percent of the Total Citations

Title	Time cited	AAS	Journal
Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China	472	10904	The Lancet
A Novel Coronavirus from Patients with Pneumonia in China, 2019	343	4112	NEJM
Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus–Infected Pneumonia	304	5617	NEJM
Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study	239	3623	The Lancet
A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster	220	4296	The Lancet
Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus–Infected Pneumonia in Wuhan, China	188	5480	JAMA
A pneumonia outbreak associated with a new coronavirus of probable bat origin	185	2800	Nature
Genomic characterisation and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding	165	1742	The Lancet
Transmission of 2019-nCoV Infection from an Asymptomatic Contact in Germany	118	8326	NEJM

Table 3 shows that the most cited articles related to Covid 19 have been published in prestigious journals such as the *Lancet, NEJM, JAMA,* and *Nature*. Also, these articles have a high AAS.

The research findings showed that a total of 382 articles received 383682 times attention on various social media. The titles of articles that have a high percentage of attention on social media are presented in table 4.

Table 4: Articles with More Than 20 Percent of the Total Attention in Social Media

Title	Time cited	AAS	Journal
Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China	472	10904	The Lancet
Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China	36	10116	JAMA
High Temperature and High Humidity Reduce the Transmission of COVID-19	0	9328	SSRN
Uncanny similarity of unique inserts in the 2019-nCoV spike protein to HIV-1 gp120 and Gag	2	9020	BioRxiv
Transmission of 2019-nCoV Infection from an Asymptomatic Contact in Germany	118	8326	NEJM
Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study	1	7547	The Lancet
First Case of 2019 Novel Coronavirus in the United States	116	7360	NEJM
Clinical Characteristics of Coronavirus Disease 2019 in China	50	6950	NEJM
The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application.	0	6658	Annals of Internal Medicine

Table 4 shows that the articles with the highest AAS were published in prestigious journals such as *Lancet, NEJM,* and *JAMA*. Table 5 presents the citation and altmetrics indicators of articles with the highest citations. These articles were cited 5521 times; the mean value of citation to every one of these articles was 14.4 times.

Table 5: Citation and Altmetric Indicators of Articles with the Highest Citations

Citation and Altmetric indicators	indicators	Non-zero occurrence (%)	Average number of non-zero occurrence	Min	Max
Citation	Citation: 5521	382 (100%)	14.4	1	472
Altmetric indicators	News: 7456	265 (69.3%)	28.13	0	363
	Blog: 928	171 (44.7%)	5.4	0	139
	Twitter: 335616	382 (100%)	875.5	1	22588
	Facebook: 1054	177 (46.3%)	5.9	0	50
	Wikipedia:29	65 (17%)	1.9	0	6
	Redit:396	107 (20%)	3.7	0	17
	YouTube: 87	48 (12.5%)	1.8	0	7

Overall, Table 5 shows that the *Twitt* indicator with 335616 times had the highest frequency followed by the *News* and *Facebook* indicators, respectively. All of the 382 articles had AAS, that is, every one of these articles received attention, at least in one of the social media. The highest and lowest AAS for these articles were 14030 and 1, respectively. Table 6 presents the information of Citation and Altmetrics indicators of articles with the highest AAS.

Table 6: Citation and Altmetric Indicators of Articles with the Highest AAS

Citation and Alt-metric indicators	indicators	Non-zero occurrence (%)	Average number of non-zero occurrence	Min	Max
Citation	Citations: 4753	235 (61.5%)	20.2	0	472
Altmetric indicators	News: 9968	326 (85.3%)	30.57	0	487
	Blog: 1165	245 (64.1%)	4.7	0	139
	Twitter: 556219	382 (100%)	1456	3	60660
	Facebook: 1291	242 (63.3%)	5.3	0	50
	Wikipedia:154	83 (21.7%)	1.8	0	6
	Redit:645	152 (39.7%)	4.2	0	33
	YouTube: 99	57 (14.9%)	1.7	0	7

The total AAS for these articles was 556219, with a mean value of 1004.4 per article. Table 6 shows that the Twitt indicator had the highest number with 556219 times followed by the News and Facebook indicators, respectively. All of the 382 articles had AAS. The highest and lowest AAS for these articles were 14030 and 6, respectively. Overall, 61.5% of these articles were cited at least one time.

Table 7 presents the results of the correlation coefficient between the Citations and Altmetrics indicators. The gray part of the table is the correlation coefficient between the indicators of articles with the highest numbers of citations; the block section is the correlation coefficient between the indicators of articles with the highest numbers of AAS.

Table 7: Spearman Correlation Between the Indicators

Indicators	Citation	AAS	News	Blog	Twitter	Facebook	Wikipe-dia	Reddit	YouTube	Total Almetrics indicators
Citation	1	0.447	0.502	0.391	0.196	0.552	0.620	0.270	0.424	0.203
		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AAS	0.481	1	0.778	0.455	0.670	0.652	0.437	0.588	0.487	0.687
	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
News	0.453	0.881	1	0.510	0.474	0.641	0.446	0.470	0.336	0.486
	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000
Blog	0.423	0.777	0.775	1	0.258	0.413	0.346	0.285	0.217	0.266
	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000
Twitter	0.471	0.958	0.759	0.702	1	0.407	0.235	0.486	0.270	1
	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000
Facebook	0.426	0.669	0.597	0.540	0.661	1	0.479	0.412	0.444	0.415
	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000
Wikipedia	0.349	0.389	0.347	0.407	0.371	0.341	1	0.322	0.301	0.241
	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000
Reddit	0.298	0.570	0.522	0.496	0.569	0.543	0.318	1	0.138	0.491
	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.007	0.000
YouTube	0.363	0.442	0.408	0.369	0.448	0.379	0.374	0.345	1	0.247
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000
Total Almetrics indicators	0.480	0.977	0.789	0.730	0.992	0.666	0.384	0.571	0.449	1
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

The result of the Spearman correlation test indicated that there was a positive significant correlation between all the indicators ($p<0.05$). For articles with the highest number of citations and the highest AAS, the correlation between the number of citations and the highest AAS was 0.481 and 0.447, respectively. There was a moderate correlation between the number of citations and Altmetrics indices (range 0.481 - 0.298).

According to Fig 1, the citation had the highest and lowest correlations with *Twitter* (0.471) and Reddit (0.298), respectively. *Twitter* and *Wikipedia* also showed the highest and lowest correlations with AAS (0.958 and 0.389, respectively).
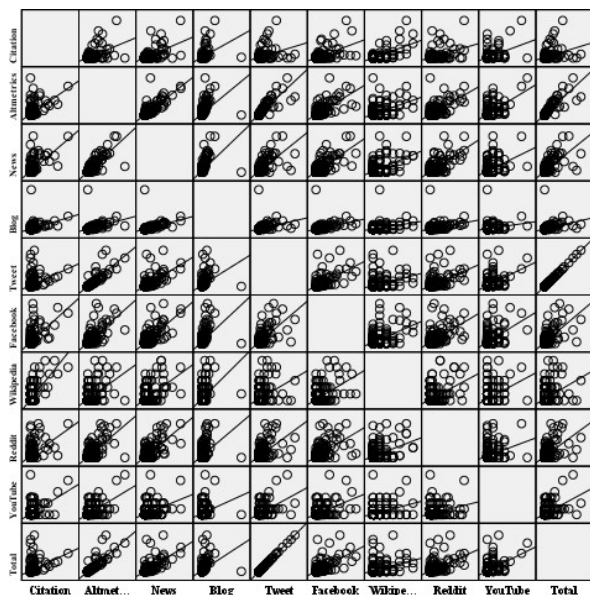
Figure 1: Spearman Correlations Between the Citation and Altmetrics Indicators (Articles with the Highest Citations)
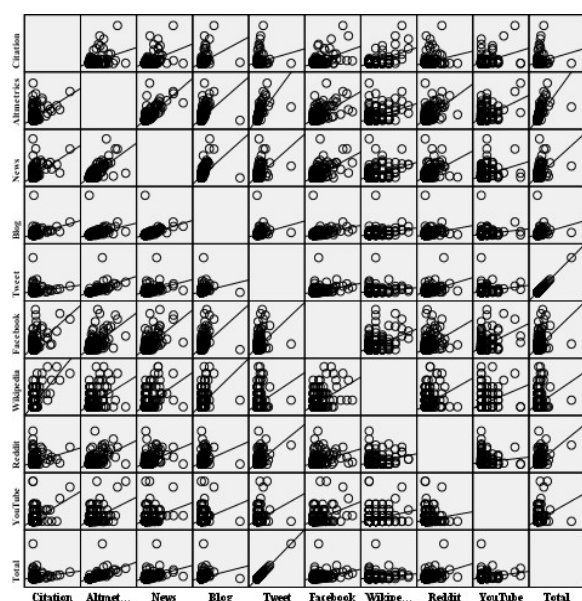

Figure 2: Correlation Between the Citation and Altmetrics Indicators (Articles with the Highest AAS)

Based on Fig 1, the correlation between the sum of the total number of all Altmetrics indices (Total Almetrics indicators) and the number of citations was 0.480; whereas based on Fig 2, this correlation was 0.203 for articles with the highest AAS. The results showed that the correlation between *Facebook* and *Twitter* was higher with other indicators.

Discussion

This research was designed to describe and analyze the citations and altmetric indicators of scientific production about COVID-19. The dimension platform is a modern and innovative linked research data infrastructure and a tool for re-imagining discovery and access to research articles. Dimensions include high-level altmetric data for every article and display this on the article details page [10]. The results of the analysis showed that 1910 scientific products about the COVID-19 were indexed in the Dimensions from December 2019 to March 2020. The results showed that authors from *China* and *Japan* were the most productive authors in this domain. These articles were accessible via preprint services and were published in journals such as The *Lancet, JAMA, BMJ, NEJM, Radiology*, and *Journal of Medical Virology*. A considerable number of these articles were accessible via preprint services including a study reported by *Alexander E, et al*. Submitted in BioRxive entitled "Severe acute respiratory syndrome-related coronavirus: The species and its viruses – a statement of the Coronavirus Study Group" with a 42 citation and 2385 AAS and also the study by Guan, Wei-Jie, et al. Submitted in MedRxiv entitled "*Clinical characteristics of 2019 novel coronavirus infection in China*" with a 42 citation and 3172 AAS. The research findings showed that 77 of the 382 articles with the highest citation counts and 103 of the 382 articles with the highest AASs were published in preprint services such as MedRxiv, BioRxiv, Research Square, ChemRxiv, and SSRN. Authors may submit revised versions of their papers to the preprint server at any time. Preprint servers are a great way for researchers to share and receive feedback on scholarly works in progress. Therefore, a preprint is a full draft research paper that is shared publicly before it becomes peer-reviewed. Most preprints are given a DOI; thus, they may be cited in other research papers [11]. A study in the Journal of the American Medical Association received notable increases in citations and altmetric scores when authors posted their work first as a preprint [12].

The results showed that out of the two groups of articles with the highest number of citations and AAS, 197 articles were common to both groups. Therefore, these articles in addition to being highly cited articles also had higher altmetric indicators. All of the articles had AAS, that is, every one of these articles received attention, at least in one of the social media. The highest and lowest AAS for these articles were 14030 and 6, respectively. In addition, the *News, Facebook, Blog, Reddit, Wikipedia*, and *YouTube* indicators were ranked next. These results show the high rate of attention of researchers and users of social media to the articles presented in this domain. Social media platforms have the potential to show and measure the rate of attention paid to any article. While it takes years to cite an article, the number of downloads, views, and mentions in social media are reported in a matter of days, even hours [13]. The rate of Like or Share on social media such as *Twitter* or *Facebook* is an indication of its progress, effectiveness, and the interest of users

in an article. These results are similar to Moradi and Alipour who found Twitter was more attractive to researchers than any other social media [14]. Nemati Anaraki et al. also explored the impact of Iranian pediatrics articles using the altmetrics method and showed that 256 articles out of 1332 articles in the field of pediatrics had altmetrics scores and were mentioned in 10 social media articles, i.e. *Mendeley, CiteULike, Weblogs, Mainstreams, Twitter, Reddit, Facebook, Pinterest, Google plus* and *Faculty 1000* [15]. Rom and Shaliny assessed the research impact of Himachal Pradesh University using alternative methods and showed that there were a considerable number of papers being discussed on social media platforms on the parameters of Usage, Capture, Mention, Social Media, and Citation. The most prominent usage pattern has been noticed as *Abstract Views on the EBSCO platform*, whereas *Mendeley* has the most favored mode of capture [16]. Batooli et al. conducted a comparative study of the impact of *ResearchGate* indicators on increasing citation counts of top clinical medicine articles of Iranian and Turkish researchers and found that all the articles were shared in *ResearchGate*. These results showed a high impact of social networks such as *Twitter* or *Facebook* in increasing the visibility of scientific works [17]. Batooli et al. also assessed the scientific output of Kashan University of Medical Sciences based on scientometric measures of Scopus, ResearchGate, and Mendeley and showed that the articles were downloaded 183 times in Mendeley and 521 times in *ResearchGate* [18]. In another study conducted by Batooli, the Top Papers of Iranian researchers were assessed based on citation indicators of WOS and Altmetrics indicators of *ReseachGate* and found that the rate coverage of articles in *ResearchGate* was 99.6% [19].

The results of this research showed a significant positive correlation between the citation and altmetric indicators. There were also significant correlations among online attention from different social media platforms. Social media brings scholarly articles to the public. Researchers and many other people are directed to scholarly articles by social media attention. Articles with more social media attention would have more visitors [20]. These results are similar to those reported by Batooli et al. who found that the correlations between the number of ResearchGate views and Scopus citations were positive and statistically significant [18]. The same was true for the correlations between the *Mendeley reads* and *Scopus* citations. Mohammadi and Thelwall showed that there was a positive relationship between the numbers of *Mendeley bookmarks* and citations [21]. Wilson and Thelwall also showed that there was a positive relationship between the number of *Mendeley bookmarks* and *Scopus citations* in medical science [22]. Batooli showed that the correlations between the numbers of *WOS citations* and the number of *views, downloads*, and *citations* in *ResearchGate* were positive and statistically significant [19].

The results of previous studies indicated that the amount of altmetric coverage of research outputs varied based on the type and nature of the subject area, the type of social media, and the database/platform used to collect altmetric data [23, 24]. In this study, only the articles indexed in Dimension in the period from December 2019 to March 2020 were evaluated and the altmetric performance of these articles was examined only based on

Dimension data. Due to the different coverage and algorithms of Altmetrics data service providers, repeating this research using data from other service providers may show different results. Therefore, in order to overcome the limitations of the current study, future research is suggested to evaluate the articles related to COVID-19 based on data from other databases/ platforms, in different periods.

Conclusion

The Corona Virus Disease-2019 (COVID-19) epidemic by 2019-nCoV is spreading worldwide. To acquire knowledge and information on COVID-19, numerous researches were conducted to explore and examine this field for four months. The results of this research showed that the information supply in the field of COVID-19 in different aspects of this disease was remarkably high. In addition, the information demand by social media audiences was also high in such a way that many of these articles attracted social media audiences over the past few months. Some of these articles were accessible via preprint services. This result showed the importance of preprinting services in increasing the visibility of scientific products. Therefore, the results of this study showed that posting a preprint led to a significant increase in altmetric attention scores and citations. The results of the research also showed that there was a significant positive correlation between the Citation and Altmetrics indicators. Therefore, the activities of researchers in social media have the potential to increase the visibility of scientific works. It is suggested that researchers use this social media as a means of "self-archiving". The present research is one of the first scientometric studies about articles on COVID-19 using the Dimensions tool. We suggest that the scientific productions presented about COVID-19 in other platforms and databases be examined and that their results be compared with the results of the present research.

References

1. World Health Organization. (2020). Naming the coronavirus disease (COVID-19) and the virus that causes it.
2. World Health Organization. (2020). Coronavirus disease (COVID-19) pandemic. 2020.
3. Bornmann, L. (2013). Is there currently a scientific revolution in scientometrics?. arXiv preprint arXiv:1307.6307.
4. Kurtz, M. J., & Bollen, J. (2011). Usage bibliometrics. arXiv preprint arXiv:1102.2891.
5. Thelwall, M., & Kousha, K. (2014). A cademia. edu: Social network or A cademic Network?. Journal of the Association for information Science and technology, 65(4), 721-731.
6. Schloegl, C., & Stock, W. G. (2004). Impact and relevance of LIS journals: A scientometric analysis of international and German-language LIS journals—Citation analysis versus reader survey. Journal of the American Society for information Science and Technology, 55(13), 1155-1168.
7. Priem, J., Piwowar, H. A., & Hemminger, B. M. (2012). Altmetrics in the wild: Using social media to explore scholarly impact. arXiv preprint arXiv:1203.4745.
8. Neylon, C., & Wu, S. (2009). level metrics and the evolution of scientific impact. PLoS biology, 7(11), e1000242.
9. Huang, W., Wang, P., & Wu, Q. (2018). A correlation comparison between Altmetric Attention Scores and citations for six PLOS journals. PloS one, 13(4), e0194962.

10. Bode, C., Herzog, C., Hook, D., & McGrath, R. (2018). A guide to the Dimensions data approach. Dimensions Report. Cambridge, MA: Digital Science.

11. Mudrak, B. (2019). What are preprints and how do they benefit authors. American Journal Experts.

12. Serghiou, S., & Ioannidis, J. P. (2018). Altmetric scores, citations, and publication of studies posted as preprints. Jama, 319(4), 402-404.

13. Wang, X., Wang, Z., & Xu, S. (2013). Tracing scientist's research trends realtimely. Scientometrics, 95(2), 717-729.

14. Moradi, S., & Alipour, O. (2019). The Characteristic of 100 top altmetrics articles. Scientometrics Research Journal, 5(10), 199-220.

15. Nemati-Anaraki, L., Aghajani-Koupaei, H., & Alibeyg, M. (2018). The impact of Iranian pediatrics articles based on Altmetric method: 2010-2016. Journal of Health Administration, 20(70), 94-106.

16. Ram, S. (2018, February). Alternative Metrics for Assessing Research Impact PlumX Tool to Showcase Academic Profile of Himachal Pradesh University. In 2018 5th International Symposium on Emerging Trends and Technologies in Libraries and Information Services (ETTLIS) (pp. 355-360). IEEE.

17. Batooli, Z., Janavi, E., & Ravandi, S. N. (2017). The impact of ResearchGate indicators on increasing citation counts of top Clinical Medicine articles in Web of Science: A Comparative study of Iranian and Turkish Researchers. QJ Knowledge Inf Management, 3, 83-93.

18. Batooli, Z., Ravandi, S. N., & Bidgoli, M. S. (2016). Evaluation of scientific outputs of Kashan University of Medical Sciences in Scopus citation database based on Scopus, ResearchGate, and Mendeley scientometric measures. Electronic physician, 8(2), 2048.

19. Batooli, Z. (2017). The relationship between Web of Science and ResearchGATE Indicators of Iranian researchers' Top Papers. Iranian Journal of Information Processing and Management, 33(1), 161-184.

20. Wang, X., Cui, Y., Li, Q., & Guo, X. (2017). Social media attention increases article visits: an investigation on article-level referral data of PeerJ. Frontiers in Research Metrics and Analytics, 2, 11.

21. Mohammadi, E., & Thelwall, M. (2013, July). Assessing the Mendeley readership of social sciences and humanities research. In Proceedings of ISSI (pp. 200-214).

22. Thelwall, M., & Wilson, P. (2016). M endeley readership altmetrics for medical articles: An analysis of 45 fields. Journal of the Association for Information Science and Technology, 67(8), 1962-1972.

23. Holmberg, K. J. (2015). Altmetrics for information professionals: Past, present and future. Chandos Publishing.

24. Ortega Priego, J. L. (2020). Altmetrics data providers: A meta-analysis review of the coverage of metrics and publication.