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Original Article

Social Media Metrics of Indian Covid-19 Research: An Altmetric Analysis

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ABSTRACT

The current pandemic situation due to Covid-19 has put every researcher on their toes to discover new methods (whether medicine or tools and techniques) to overcome the menace from the human population. The research focus has given the generation of enormous amount of both published literature and raw research data. The research impact analysis with the help of traditional method is a time-consuming process, resulted in choosing alternative methods of impact measurement - now popularly known as Altmetric. The article analyses social media metrics of Indian publications on Covid-19 through altmetric approaches. The data for the study has been taken from Scopus and Altmetric.com and analysis was carried out for different social media activities to calculate the Altmetric attention score for Indian published literatures. An analysis was also carried out to assess whether the alternative metrics have any correlation with the citation impact. It is found that correlation between some of the social media activities and citations is highly significant.

Key words: Coronavirus, Covid-19, Altmetric, India, Publications, Research impact, Bibliometrics, Scientometrics.

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INTRODUCTION

Under this pandemic situation there has been a tremendous growth of the literature pertaining to the Covid-19 research at national (including in India) and international level. Citation-based research impact is one of the popular methods being used since decades. However, the traditional citation-based impact is losing its importance when it comes to the breaking through research and emerging topics (technology or practicable research) because of the long time duration.[1] Similarly, research at local or national research is poorly cited in international publications. As a result much interest is being taken by the research scholars in opting for alternative methods based on social media activities and is known as Altmetrics.[2] New form of impact being conceptualized based on the social media activities of research literature. The altmetric track the activities of the literature on social media (such as News, Blog, Policy, Patent, Twitter, Peer review, Weibo, Facebook, Wikipedia, Google+, LinkedIn, Reddit, Pinterest, F1000, Q&A, Video, Syllabi, Mendeley readers and Dimensions citations).[3] The impact being analyzed as an alternative to the citations in terms of number of readers, number of times the article downloaded, shared, viewed, commented, etc on social media platforms. It is assumed that such social media activities have significant correlation with the citations of an article.[4]

This present study is an attempt to analyze the social media activities of the Covid-19 publications originated from India. Of late, a number of altmetric studies have appearing on various topics, but their scope related to Covid-19 is limited. The Covid-19 related altmetric studies covers the topic corresponds to general studies,[5-9] top cited articles[10,11] and correlational studies.[12,13] These studies are related to assessment of impact over citation activities based on Dimensions database[6,9] of various social media tools such as Twitter. However, assessment of Indian publications is limited. The scope of the study is limited to Indian publications on Covid-19 indexed in Scopus and covered in Altmetric database available at https://www.altmetric.com/.

MATERIALS AND METHODS

The study is based on the bibliographic data retrieved from Scopus database using the following search string.

(Title-Abs-Key ("Coronavirus") or Title-Abs-Key ("nCoV") or Title-Abs-Key ("covid") or Title-Abs-Key ("covid19") or Title-Abs-Key ("covid-19")) and (Limit-To (Affilcountry, "India")).

The bibliographic data retrieved from the Scopus database were exercised to find out its coverage in Altmetric Database. The librarian's version of Altmetric explorer was used to fetch the data using the Digital Object Identifier (DOI). The data exported from the altmetric perspective was subjected to analysis for various social media activities of the Indian Covid-19 publications. Pearson's correlation coefficient was calculated using Microsoft Excel to adjudge relationship between different variables.

RESULTS AND DISCUSSION

Overall Aspects

The Scopus databases had indexed 13, 825 articles of Indian origin with the Covid related keywords present in Author, Title, and Abstract fields. The coronavirus publication available from India can be traced back to 2001 and till 2021 (30 July 2021). Most of the Indian available publication belongs during the last one and half year, after the resurgence of the Covid-19 pandemic across the globe. This deadly pandemic is extremely severe as compared to earlier SARS-CoV epidemic 2002-03[14] of MERS-CoV in 2012-13.[15] From 2001 till 2019, only 1.52% (210 articles) of total India's publication appeared; whereas 48.39% (6690 articles) appeared in 2020 and 50.09% (6925 articles) appeared in 2021

The Indian publications were distributed into twelve document types. Most of the publications appeared as journal articles (54.31% and 7508 articles), reviews (16.56% and 2289 articles), letters (14.54% and 2010 articles), and conference papers (6.16% and 852 articles), whereas other documents types were notes (3.28% and 454 articles), editorials (2.77% and 383 articles), book chapters (1.59% and 220 articles). Rest of other document types were less than one percent of the total publications

Altmetric Coverage Patterns of India's Publication

Out of 13,825 articles published from India and indexed in Scopus, Altmetric.com had covered 4,678 articles, which is 33.84% of total Scopus indexed articles. As might be expected, documents published in 2002-19, might have not much impact on social media in comparison to the articles published between 2020 till 2021 because of more engagement and pandemic situation and moreover popularity of use of social media platform. The social media is now becoming a popular method for sharing research with global society.[16]

Altmetric.com metrics are based on the activities on nineteen different social media platforms. These are (but are not limited to Faculty of 1000 reviews, Wikipedia, public policy documents, patents citations, blog discussions, news media coverage, Mendeley reference manager bookmarking, social media mentions such as Twitter, Facebook, Google+, Reddit, Weibo.[17–19] Table 1 gives the frequency distributions of the social media mentions activities over different platforms.

In altmetric, Dimensions extract citation data from CrossRef, PubMed Central and Open Citation Data as well as citation data directly from full text articles from the publishers.[20,21] Of 13825 articles, 4678 articles were covered for citation data. These articles have accumulated a total of 56,713 dimensions citations with an average activity of 13.28. Mendeley is a platform for bookmarking and organizing references and assist in writing citations in a research article, generating bibliography and combating plagiarism.[22] A total of 99.42% articles were mentioned over Mendeley platform with total social media activities of 35, 9411

Table 1: Altmetric Coverage of Indian Covid-19 Publications.

Name of SMA Platforms	TP with SMA	% of 4678	Total Sum of SMA	Average of SM Activities
Dimensions citations	4269	99.51	56713	13.28
Mendeley readers	4265	99.42	359411	84.27
Twitter mentions	3794	88.44	148340	39.10
News mentions	914	21.31	8116	8.88
Facebook mentions	559	13.03	959	1.72
Blog mentions	443	10.33	862	1.95
Video mentions	132	3.08	174	1.32
Syllabi mentions	132	3.08	0	0.00
Reddit mentions	130	3.03	219	1.68
Policy mentions	113	2.63	250	2.21
Wikipedia mentions	96	2.24	123	1.28
Peer review mentions	47	1.10	81	1.72
Q&A mentions	15	0.35	2	0.13
F1000 mentions	13	0.30	21	1.62
Patent mentions	5	0.12	9	1.80
Total articles covered in Altmetric	4678			

NP=Number of Publication, SMA=Social Media Activities

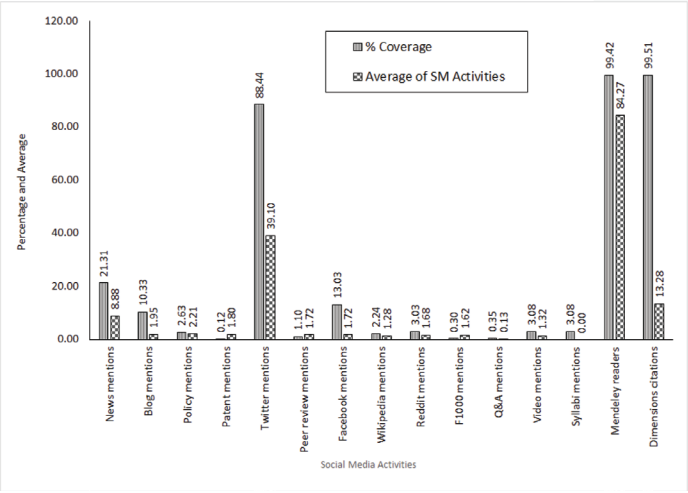

Figure 1: Social Media Activities of the Indian Covid-19 Publications.

times (Average SMA of 84.27) which is highest among all the social media activities. A total of 3794 (88.44% of 4678) articles has Twitter activities. These articles were twitted 14, 8340 times with an average SMA of 39.10 twits. Distantly, 914 articles (21.31%) were mentioned in News; 559 (13.03%) shared on Facebook; and 443 (10.33%) articles were mentioned in Blog posts. Rest of others (about 15.92%) articles were mentioned in Video, Syllabi, Reddit, Policy, Wikipedia, Peer review, Q&A, F1000, and Patent (Figure 1).

The Altmetic attention score (the weighted count of all attention) which is based on the social media activities is the parameter for assessing the alternative metrices.[23] It is found that the Indian Covid-19 publications have accumulated a total Altmetric attention score of 142289 (Average = 31.78) of its 95.78% articles. The maximum Altmetric attention of 6068 was achieved by the article "*Epidemiology and transmission dynamics of Covid-19 in two Indian states*".[24] All these Indian articles have been Twitted for about 15, 5491 (Average = 37.60) of its 88.41% articles appeared in Altmetric. The highest twitter activity was witnessed for the article Laxminarayan[24] for about 7175 times. Similarly, the article "*A Review of Coronavirus Disease-2019 (COVID-19)*" founds the most number of Mendeley readers (4533 readers) with an overall readership of 383571 (Average=82.51) for its 99.40% articles have readers on the Mendeley platform. The same article has most number of Dimensions Citations (1057 citations) with an overall citations of 59,367 with an average citation per article of 17.28 citations for its 73.97% articles with social media activities. The social media activities with less emphasis were F1000, Q&A and Patent mentions (Table 2).

Correlation between Social Media Activities

The Altmetric score obtained from the explorer for all the Indian articles on Covid-19. The data analysis was carried out to know if any correlation exists amongst the social media platforms. The statistics for this study was carried out with Microsoft Excel, and significant relationship was interpreted using a predetermined *P*-value threshold of <.05. The Pearson's Correlation Coefficient (*r*) was determined to know the relationship exists between different variables. Furthermore, the analysis was carried out to find out if there is any correlation exists between social media activities on the citation of the articles recorded at Dimensions Database.

Table 3 gives the status of correlation between various Social Media Applications in Indian Covid-19 research indicated that there was a positive significant relationship between all the indicators ($p<0.05$).

Table 2: The Social Media Activities of the Indian Publications on Covid-19.

Altmetric and Social Media Applications	Total Activities	Non-Zero Count	% of Non-Zero Value	Average	Median	Min	Max
Altmetric Attention Score	142289	4478	95.75%	31.78	4	0	6068
News mentions	8415	989	21.15%	8.51	1	0	383
Blog mentions	896	471	10.07%	1.90	1	0	35
Policy mentions	254	117	2.50%	2.17	1	0	12
Patent mentions	10	6	0.13%	1.67	1	0	3
Twitter mentions	155491	4135	88.41%	37.60	4	0	7175
Peer review mentions	93	53	1.13%	1.75	1	0	7
Facebook mentions	1025	614	13.13%	1.67	1	0	25
Wikipedia mentions	126	99	2.12%	1.27	1	0	4
F1000 mentions	21	13	0.28%	1.62	1	0	6
Q&A mentions	2	2	0.04%	1.00	1	0	1
Video mentions	202	133	2.84%	1.52	1	0	17
Mendeley readers	383571	4649	99.40%	82.51	42	0	4533
Dimensions citations	59367	3436	73.47%	17.28	6	0	1057

Table 3: Correlation between various Social Media Applications in Indian Covid-19 Research.

Name of Social Media	News	Blog	Policy	Patent	Twitter	Peer Review	Facebook	Wikipedia	Reddit	F1000	Q&A	Video	Mendeley readers
News	---												
Blog	0.731	---											
Policy	0.174	0.251	---										
Patent	*-0.003*	0.000	0.044	---									
Twitter	0.524	0.554	0.326	*-0.003*	---								
Peer Review	0.040	0.049	0.048	*-0.003*	0.009	---							
Facebook	0.411	0.442	0.264	0.003	0.589	0.014	---						
Wikipedia	0.222	0.167	0.141	*-0.004*	0.272	0.002	0.228	---					
Reddit	0.350	0.393	0.139	*-0.004*	0.534	0.016	0.397	0.126	---				
F1000	0.515	0.610	0.058	*-0.001*	0.289	0.020	0.259	0.144	0.173	---			
Q&A	0.310	0.371	0.225	*-0.001*	0.551	-0.002	0.191	0.048	0.354	*-0.001*	---		
Video	0.099	0.109	0.036	0.011	0.276	-0.002	0.187	0.077	0.132	0.067	*-0.002*	---	
Mendeley Readers	0.170	0.259	0.233	0.115	0.164	0.045	0.217	0.168	0.093	0.123	0.073	0.104	---
Dimensions Citations	0.279	0.411	0.274	0.098	0.261	0.050	0.290	0.200	0.156	0.262	0.140	0.095	0.881

Note: ($p<0.05$)It can be found that most of the social media activities have strong correlation amongst each other, where a significant strong correlation can be found between gives the status of correlation between various social media activities (SMA). The strong correlation has been shown by Mendeley Readership with Dimensions Citations (r=0.881) followed by Blog and News (r=0.731), Facebook and Twitter (r=0.589), Twitter and Blog (r=0.554). However, some of the social media activities shows week or negative correlation. Patent mention is having week correlation with other social media activities.

Correlation between Social Media Activities and Citations

The data analysis was carried out to assess if the Social Media Activities (SMA) have any impact on citations of the Indian articles in the area of Covid-19 research. To know the relationship, Pearson Correlation Coefficient for citation in relation with SMA was analyzed. It is found that most of the social media activities have strong correlation in terms of citation impact, especially the Blog mentions (r=0.411) and Mendeley readerships (r=0.881) (Table 3).

The data analysis for understanding the relationship of individual SMA with Dimensions Citations was also considered. The relationship was assessed using the Pearson's correlation coefficient with each set of data. The study co-related with the previous studies which highlighted a positive co-relation between the social media activities and citations [25].

For each social media activities with high correlation, a separate scattered graph was plotted and calculated Pearson correlation coefficients to find of the degree of correlation between SMA and dimensions citations. There was strong correlation of SMA with dimensions for Mendeley readers (r=0.881) followed by Blog mentions (r=0.411), Facebook mentions (r=0.290), News mentions (r=0.279), Policy mentions (r=0.274), F1000 mentions (r=0.262), Twitter mentions (r=0.261) and Wikipedia mentions (r=0.200) (Fig. Some of the SMA have shown which is a nearly strong correlation such as Reddit mentions (r=0.156), Q&A mentions (r=0.140), whereas Patent mentions (r=0.098), Video mentions (r=0.095), and Peer review (r=0.050) have low correlation with dimensions citations. The four SMAs such as Weibo mentions, Google+ mentions, LinkedIn mentions, Pinterest mentions do not have any activities of Indian Covid-19 publications. Here it is notable to note that Twitter mentions is not having much impact in case of the Indian Covid-19 publications, as shown in some other studies where Twitter mentions have strong correlation with citations.[18,26]

Figure 2 (A-C) presents the high correlation coefficient between different social media activities such as news mentions (Figure 2A), twitter (Figure 2B) and Mendeley readership (Figure 2C) with dimensions citations of Indian Covid-19 publications.

Co-relation amongst the International Publications

The Indian Covid-19 publications were further analyzed which have been internationally collaborated. There were 2693 Indian articles were published with internal collaboration. Each of these publications were further analyzed to assess if any correlation exists between different social media platforms. It is found that most of the social media activities shown higher correlation as compared to overall publications. The significant correlation has been found in case of Mendeley readership with Dimensions Citations (r=864) followed Blog mentions and News mentions (r=814), Facebook mentions and News mentions (r=517), Blog mentions (r=570), Twitter mentions (r=552); Reddit mentions and Blog mentions (r=512); F1000 mentions and Blog mentions (r=534) (Table 4)

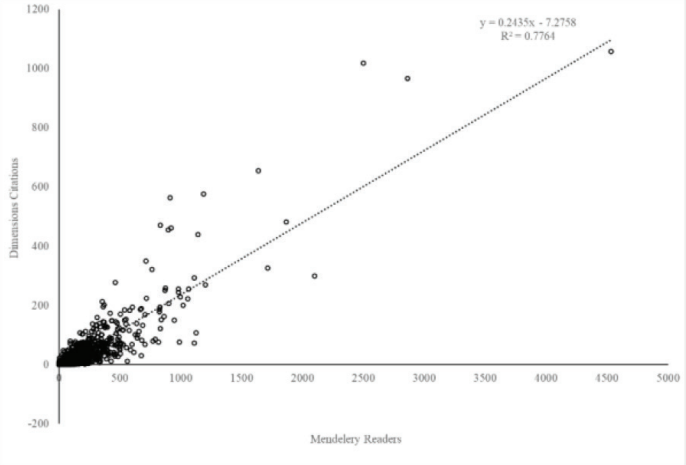

Figure 2C: Correlation between Mendeley Readerships with Dimensions Citations.

Table 4: Correlation between various Social Media Applications in Indian Covid-19 Research Publications with International Collaboration.

Social Media Mentions	News	Blog	Policy	Patent	Twitter	Peer review	Facebook	Wikipedia	Google+	Reddit	F1000	Q&A	Video	Mendeley readers
News mentions	---													
Blog	0.814	---												
Policy	0.226	0.297	---											
Patent	-0.003	-0.004	-0.003	---										
Twitter	0.366	0.417	0.295	-0.003	---									
Peer review	0.029	0.022	0.077	-0.002	0.000	---								
Facebook	0.517	0.570	0.386	-0.005	0.552	0.003	---							
Wikipedia	0.287	0.324	0.245	-0.004	0.254	-0.005	0.300	---						
Google+	-0.002	0.008	0.063	0.000	-0.001	-0.002	0.009	-0.003	---					
Reddit	0.455	0.512	0.235	-0.003	0.620	0.006	0.444	0.232	-0.003	---				
F1000	0.465	0.534	0.077	-0.001	0.213	0.006	0.290	0.186	-0.001	0.220	---			
Q&A	0.281	0.355	0.274	-0.001	0.316	-0.002	0.161	0.074	-0.001	0.376	-0.001	---		
Video	0.194	0.258	0.171	0.081	0.392	-0.011	0.329	0.263	-0.003	0.234	0.163	0.057	---	
Mendeley readers	0.275	0.410	0.336	0.048	0.238	0.030	0.411	0.264	-0.004	0.209	0.224	0.119	0.259	---
Dimensions citations	0.379	0.546	0.378	0.113	0.313	0.031	0.494	0.317	0.002	0.281	0.396	0.207	0.307	0.864

Note: (p<0.05)

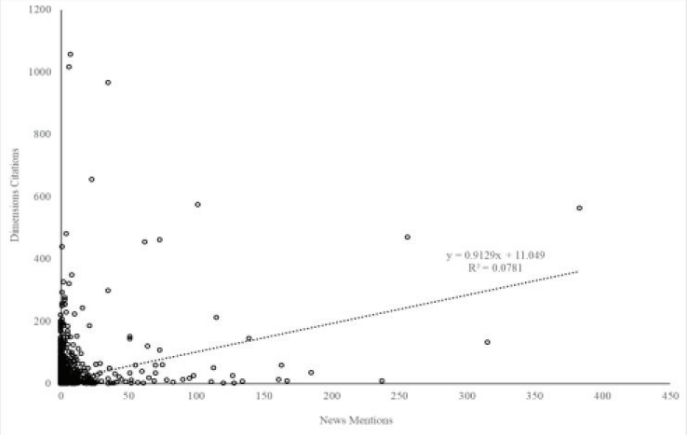

Figure 2A: Correlation between News Mentions with Dimensions Citations.

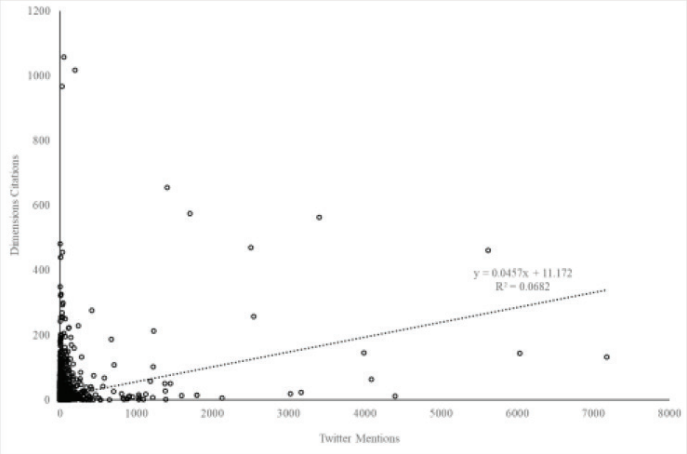

Figure 2b: Correlation between Twitter Mentions with Dimensions Citations.

CONCLUSION

The study presents the social media activities of the Indian Covid-19 research publications indexed in Scopus databases and included in Altmetric.com. Out of the 13825 articles indexed in Scopus, 33.84% were included in Altmetric.com. The articles were distributed over fifteen different social media activities, where Mendeley readership, Twitter mentions and Dimensions citations were top three social media activities. Based on the data analysis it is concluded that the articles which have higher Mendeley readership or twitter mentions or news mentions have higher Altmetric attention score. Furthermore, there is a high significant correlation has been found that the articles which have high Mendeley readership have high citations, followed by Blog mentions, Twitter mentions, news mentions and Facebook mentions. It can be also found that the international publications have higher social media activities and high correlation coefficient with respect to the citations of the article. The social media activities are playing key role is assessing the research impact giving rise to alternative metrics as compared to the traditional methods of the assessment.

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CONFLICT OF INTEREST

The authors declare no conflict of interest

ABBREVIATIONS

COVID: Coronavirus disease; **nCOV:** Novel Coronavirus; **Q&A:** Question & Answers; **SMA:** Social Media Activities.

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