**COVID-19 and Social Media In Bangladesh: Bibliometric Analysis And Systematic Review**

**Abstract:** The role of social media is an arguable issue during the coronavirus outbreak (COVID-19). In Bangladesh, the use of social media has increased considerably over the last few years. The study explored the use of social media for COVID-19 research within the context of Bangladesh. By putting together a bibliometric analysis and a systematic review, we analyzed 50 documents in this area. Our findings indicate that mental health, misinformation, physical health, education, and prevention are the major research topics in this area. The study revealed that Bangladeshi researchers used social media to gather data and analyze social media content. The study also found that the survey was the most widely used methodology for pandemic research. Moreover, MAMUN MA, ISLAM MS and SIKDER MT have been identified as the most important authors in this domain. The findings can help future researchers to better understand the role of social media and suggest new research areas.

**Keyword: Covid-19, social media, Bangladesh, Bibliometric analysis, systematic review**

1. **Introduction:**

The Arrival of the Covid-19 virus devastated the public health sector(Group, 2020).It also badly affected many areas of human life(CEPAL, 2020; Fu, Hereward, MacFeely, Me, & Wilmoth, 2020) . The research related to Covid-19 was not limited to the field of public health, but it goes beyond other areas of studies(Shek, 2021; Qiu, Park, Li, & Song, 2020; Ozdemir, 2020). The role of media during the pandemic came as one of the significant research areas(Chao, Xue, Liu, Yang, & Hall, 2020 ; Liu, 2020). Media and social media have been used as a medium of updated news and information related to Covid-19(Azlan, Hamzah, Sern, Ayub, & Mohamad, 2020). Social media played crucial roles both positively(Baniamin, 2021) and negatively(A. K. M. N. Islam, Laato, Talukder, & Sutinen, 2020). At one hand it creates awareness among the public(Almotawa & Aljabri, 2020). On the other hand, fake news and misinformation became widespread by social media during the pandemic(Al-Zaman, 2021b). Thus, multi-disciplinary research has been conducted with social media at both the global level(Lazzini, Lazzini, Balluchi, & Mazza, 2021) and local levels(Holmes et al., 2020).

Social media users have been rising in recent years. Between 2020 and 2021, over nine million new users joined social media platforms in Bangladesh, according to a survey ("Bangladesh Charts 9m", 2021). The research found that Bangladeshi citizens use social media for getting updated information. During the pandemic Bangladeshi people rely on social media greatly for getting the update, sharing information, or expressing their views. A study found that creative social media use improves online knowledge of Covid-19 precautions, which helps avoid Covid-19 outbreaks in Bangladesh(M. M. Islam, Islam, Ahmed, & Rumana, 2021).

So, it’s important for any new researcher who has the interest to work on Covid-19 and social media, to know the broader picture of this field. This paper aims at presenting a comprehensive review of this research area.

Based on above discussion, the paper formulates 4 research questions as follow

RQ 1: What is the main area of research in this domain?

RQ 2: Particularly which research methodologies have been used?

RQ 3: How did social media facilitated Covid-19 research in Bangladesh?

RQ 4: Who are the top authors in this field?

In this study, we retrieved Covid-19 related research articles from the web of science database which have been done using social media in Bangladesh. Firstly, we analyze the metadata of these researches by using the bibliometric analysis method using the bibliometric R package. Later we reviewed the content of all papers manually. Our study presented the main area of research, types of data used in these researches, basic findings of these research, list of top authors and other important issues.

1. **Data and Methodologies:**

This study adopts the SALSA framework for collecting relevant data for analysis. This process for determining the search protocols that the SLR should follow is known as the Search, Appraisal, Synthesis, and Analysis (SALSA) framework. This ensures the accuracy, systematization, comprehensiveness, and reproducibility of the methodological procedures(Grant & Booth, 2009). During the first stage, search, make sure you don't miss any relevant items or parameters. Booth (2016) advocated using broader keywords and parameters for the initial search.

The current study used the Web of science (WOS) database for gathering literature on Covid-19 and social media in Bangladesh. WOS is a worldwide recognized Clarivate Analytics-managed research platform that provides access to more than 50 million papers published in peer-reviewed journals across a variety of research fields (Merigó, Mas-Tur, Roig-Tierno, & Ribeiro-Soriano, 2015) . The WOS core collection comprises records pertaining to papers that date all the way back to 1996.

The search was conducted using the following parameters to guarantee that all available data was collected.

Topic: “Covid-19”

AND

“Social Media”

AND

“Bangladesh”

• Timespan: 2020-2021

Indexes=SSCI, A&HCI, SCI-EXPANDED, CPCI-S, BKCI-S, BKCI-SSH, ESCI, CPCI-SSH,CCR-EXPANDED.

As a data selection process, at first, we searched covid-19 related documents in the Web of Science database. To get the exact document we used keywords ‘’Covid-19’’, ‘’Social Media’’ and Bangladesh. Initially, we found 72 documents. Among them, we excluded editorials, letters and proceeding papers and we took 65 documents as research articles, early access papers and review papers. Later, we went through the title and abstract of 65 papers. In this stage, we excluded 15 papers that are not related to Bangladesh or social media or Covid-19 keywords. In the final stage, we reviewed 50 papers.

We applied two different methodologies to analyze our finally selected 50 papers. First, we implemented a bibliometric analysis to obtain information such as top authors, top, Sources and a summary of the metadata of these papers. In the second stage, we implemented a systematic review to synthesize key findings of these papers, reveal the methods used in these studies and explore the types of social media used in the studies.

Bibliometric analysis is a popular method that allows the analysis of many pieces of literature using the R programing language. Previously, researchers employed bibliometric methods to estimate publishing activity across a variety of fields(Pasadeos & Renfro, 1992);(Casado-Aranda, Sanchez-Fernandez, & Viedma-del-Jesus I, 2021). Recent years have seen a surge in the usage of bibliometric reviews, owing to their ability for mapping science via citations and co-citations (Ashraf Khan, Hassan, Paltrinieri, Dreassi, & Bahoo, 2020;(Archambault, Campbell, Gingras, & Larivière, 2009).

As Bibliometric analysis primarily focused on metadata to syntheses the literature, we used systematic review too. A systematic review is characterized as "an evaluation of the evidence on an identified subject that employs systematic and explicit techniques for identifying, selecting, and critically appraising relevant primary research, as well as extracting and analyzing data from the included studies." Reproducible and transparent approaches must be employed. (K. S. Khan, Ter Riet, Glanville, Sowden, & Kleijnen, 2001). It uses processes that reduce biases and random errors to synthesize many primary research findings that are connected(Cook, Mulrow, & Haynes, 1997).

We formulated 4 research Questions and manually went throw the 50 papers. Later, we formulated our table to synthesis 5 types of data about these papers as Sample size, methods, types of social media users and the findings of these papers. By using both Bibliometric analysis and systematic approach our study presents a comprehensive summary of this literature.

1. **Findings and analysis**

**3.1 Summary of Data**

|  |  |
| --- | --- |
| **Description** | **Results** |
| **Main Information About Data** |  |
| Timespan | 2020-2021 |
| Sources (Books, Journals, etc) | 36 |
| Documents | 50 |
| Average years from publication | 0.359 |
| **Authors** |  |
| Authors | 305 |
| Author Appearances | 373 |

Table 1 Summary of data

The information gathered from the WOS core collection is summarized in Table 1. This study identifies a total number of 50 documents by 305 authors during the timespan 2020–2021. These documents were published from 36 different sources. The bibliometric analysis reveals that the Covid-19 research by social media can be characterized by high collaboration.

**3.2 Top sources**

Figure 1 Top sources

In terms of the number of documents, PLOS ONE became the most important journal to have published articles on COVID-19 and social media in Bangladesh. It published 7 articles on this issue while the journal of Public Health and Heliyon ranked second as both published 3 documents each.

**3.2.1 Core journals**

Timeline

Description automatically generated with low confidence

Figure 2 Bradford's Law

Bradford's law (Bradford, 1934) identifies five publications as the key journals in this discipline. That example, as demonstrated by the shaded region in Figure 2, these five journals produced one-third of the overall collection in this field. Seven papers (14%) are from the PLOS ONE journal, followed by articles from the Journal of Public Health and Heliyon.

**3.3 Top authors**

|  |  |
| --- | --- |
| Authors | Articles |
| MAMUN MA | 6 |
| ISLAM MS | 5 |
| SIKDER MT | 4 |
| HASAN MT | 3 |
| HOSSAIN S | 3 |
| ISLAM MA | 3 |
| MIM SS | 3 |
| AL-ZAMAN MS | 2 |
| AL BANNA MH | 2 |
| AL MAMUN F | 2 |

Table 2 Top Authors

In terms of the number of Publications, Mamun MA contributed to the field with the highest number of publications. Mamun MA along with co-authors published 6 documents while Islam MS and Sikder MT published 5 and 4 documents accordingly.

**3.4 Areas of study**

|  |  |
| --- | --- |
| **Area** | **Author** |
| **Mental Health** | M. A. Mamun, 2021a ; Ahmed, Aurpa, & Anwar, 2021; Ayatullah Khan et al., 2021  Alam, Bin Ali, Banik, Yasmin, & Salma, n.d.; M. S. Islam, Sujan, et al., 2021; M. I. Hossain, Mehedi, Ahmad, Ali, & Azman, 2021; Marzo, Singh, & Mukti, 2021; M. A. Mamun, 2021b ; Ripon et al., 2020 ; M. A. Mamun et al., 2021; F. al Mamun, Hosen, Misti, Kaggwa, & Mamun, 2021; M. A. Rahman et al., 2020 ; M. A. Mamun et al., 2020 ; M. T. Hossain et al., 2020 ; Banerjee et al., 2020 |
| **Vaccine** | Abedin et al., 2021 ; M. S. Islam, Kamal, et al., 2021; Musa & Husna, 2021 |
| **Misinformation** | Yesmin & Ahmed, 2021; Al-Zaman, 2021a ; M. S. Islam, Kamal, et al., 2021; Al-Zaman, 2021b ; A. K. M. N. Islam et al., 2020 |
| **Policy** | Cowley et al., 2021; Basher & Haque, 2021 |
| **Socio economy** | Arafat et al., 2020 ; G. Rasul et al., 2021 |
| **Physical Health** | Sikdar et al., 2021 ; Sharif et al., 2021 ; Baniamin, 2021; M. S. Islam et al., 2020 ; Malik et al., 2020 |
| **Education** | Mathrani, Sarvesh, & Umer, 2021 ; Begum, Roknuzzaman, & Shobhanee, 2021 ; Ali et al., 2021; Kundu et al., 2021; Kundu et al., 2021 ; Ferdous et al., 2020 |
| **Prevention measure** | M. M. Islam et al., 2021; Das et al., 2021; Hosen et al., 2021 |
| **Others** | Rashid, Idris, Zulkiflee, Yahaya, & Ramesh, 2021; M. S. Rahman, Alam, Salekin, Belal, & Rahman, 2021 |

Table 3 Areas of study

According to table 3, the Mental health area witnessed the highest number of publications. Other key areas of research include disinformation, physical health, education, prevention, and fewer published policy articles.

**3.5 key features of mental health related papers**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Headline | Data | Method | Types of  social media | Finding |
| Mental health impacts of COVID-19 outbreak and associated drivers among university students in Bangladesh | 368 participants | Online survey | Not specified | Anxiety was estimated to be 87% prevalent. |
| Assessing the mental health condition of home-confined university level students of Bangladesh due to the COVID-19 pandemic | 509 university students. | Online survey | Facebook, WhatsApp, and Instagram | Students' mental health issues grew due to coronavirus exposure, insecurity, social media use, and smoking. |
| Problematic Smartphone and Social Media Use Among Bangladeshi College and University Students Amid COVID-19: The Role of Psychological Well-Being and Pandemic Related Factors | 5,511 university students | online survey | Not specified | Mean scores for USFP and USFP were 20.8 6.8 (out of 36) and 14.7 4.8 (out of 30). |
| Psychosocial stress and trauma during the COVID-19 pandemic: Evidence from Bangladesh | 10 journal articles and 45 newspaper reports | Systematic review | Not specified | The coronavirus outbreak severely impacted mental health. |
| A survey of psychological distress among Bangladeshi people during the COVID-19 pandemic | 503 respondents | cross-sectional survey | Not specified | 44.3 percent of the respondents reported mild-moderate distress and 9.5 percent reported severe distress. |
| Prevalence and risk factors of COVID-19 suicidal behavior in Bangladeshi population: are healthcare professionals at greater risk? | 3,388 respondents | cross-sectional study | Not specified | Suicidal behaviors were reported by 6.1% of participants. |
| Suicide and Suicidal Behaviors in the Context of COVID-19 Pandemic in Bangladesh: A Systematic Review | 9 journal articles | systematic  review | Not specified | Four of the studies assessing the prevalence of suicide behaviours and risk factors, while the remaining five were retrospective. |
| The COVID-19 pandemic and serious psychological consequences in Bangladesh: A population-based nationwide study | 10,067 respondents | Online cross-sectional survey | Not specified | COVID-19 was associated with 33% depression and 5% suicidal ideation. |
| Mental Disorders of Bangladeshi Students During the COVID-19 Pandemic: A Systematic Review | 7 articles | A systematic review | Not specified | The prevalence rates of mild to severe symptoms of depression, anxiety, and stress ranged from 46.92% to 82.42%, 26.62% to 96.822%, and 28.52% to 70.12%. |
| Social and electronic media exposure and generalized anxiety disorder among people during COVID-19 outbreak in Bangladesh: A preliminary observation | 880 participants | Online survey | Facebook | About half of those surveyed reported an increase in anxiety (49.1 percent ). |
| Psychological and nutritional effects on a COVID-19-quarantined population in Bangladesh | 5792 individuals | Online survey | Facebook, and LinkedIn | Depression was found in 24% of respondents and was linked to dietary changes (misconception). |
| The impact of the COVID-19 pandemic on the mental health of the adult population in Bangladesh: a nationwide cross-sectional study | 1,427 respondents | Online survey | Not specified | Anxiety and depressive symptoms were found in 33.7% and 57.9% of people. |
| Depression and anxiety among university students during the COVID-19 pandemic in Bangladesh: A web-based cross-sectional survey | 476 university students | Cross-sectional web-based survey | Facebook | Students were depressed and anxious. |
| COVID-19: psychological effects on a COVID-19 quarantined population in Bangladesh | 5792 respondents | Online survey | Instagram, Facebook and LinkedIn | Male institutional quarantined had the most PTSD symptoms. |
| Impact of the COVID-19 pandemic on psychosocial health and well-being in South-Asian (World Psychiatric Association zone 16) countries: A systematic and advocacy review from the Indian Psychiatric Society | Thirteen studies | A systematic review | Not specified | Non-psychotic depression, preanxiety, somatic disorders, drinking disorders and insomnia have increased. |

Table 4 Feature of mental health related papers

Our study found Mental health is the key area of research among our selected papers. Table 4 demonstrated that in terms of methodology most of the studies used the survey method while few studies conducted a systematic review. In terms of the respondent, the range fluctuates from around 500 to 10000. Different social media platforms such as Facebook, Twitter, messenger, LinkedIn, etc. have been used for research purposes. The study found that some researchers used social media to collect data of survey while others analyzed social media posts or trends. Table 4 shows that the studies focused on depression, the psychological impact of covid-19, anxiety, suicidal tendency, etc.

**3.6 Features of misinformation related papers**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Headline | Data | Method | Types of social media | Finding |
| Infodemic surrounding COVID-19: Can LIS students recognize and categorize "problematic information" types on social media? | An online survey was conducted among students. | Quantitative data analysis | Not specified | The findings demonstrated that students' awareness of infodemic and related terms, as well as COVID-19-related harmful social media posts, was lacking. |
| Prevalence and source analysis of COVID-19 misinformation in 138 countries | This study looked at 9657 items of misinformation from 138 nations. | Quantitative- data analysed | All social media platforms | The statistics suggest that India (15.94%) has the most disinformation.  Social media (84.94%) produces the most misinformation. Among all social media platforms, Facebook creates 66.77% of misinformation. |
| COVID-19 vaccine rumors and conspiracy theories: The need for cognitive inoculation against misinformation to improve vaccine adherence | Sources included social media, television and newspaper websites. | Quantitative data analysis | Facebook, YouTube, Twitter | The investigation found 637 COVID-19 vaccines, 9 per cent of which were conspiracy ideas from 52 countries. Sixty-six percent of the 578 rumors were about vaccine development, availability and access, while eight percent were about vaccine safety, efficacy and acceptance. |
| Social media and COVID-19 misinformation: how ignorant Facebook users are? | The study based on 11,716 comments from 876 Facebook. | Quantitative data anaysis | Facebook | Most users trust disinformation (60.88%) and few can deny (16.15%) or doubt (13.30%). |
| Misinformation sharing and social media fatigue during COVID-19: An affordance and cognitive load perspective | 433 Bangladeshi respondents | Analysis based on structural equation modelling and neural network techniques. | Not specified | People motivated by self-promotion and entertainment are more likely to broadcast dubious information. |

Table 5: Features of misinformation related papers

Misinformation is another key area of research among our selected literature. Social media Misinformation related studies mostly adopted quantitative data analysis methods. Some studies followed survey while few studies examined Facebook posts and comments. The result of the studies revealed that social media have been used as a prime source of misinformation.

**3.7 Features of physical health related papers**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Headline | Data | Method | Types of social media | Finding |
| Evaluation of sleep quality, psychological states, and subsequent self-medication practice among the Bangladeshi population during Covid-19 pandemic | 2941 respondents | Survey | Facebook, WhatsApp, Viber, IMO etc | 10% to 29.5% had severe sleep problems, and some had severe anxiety and depression. |
| The positive impact of social media on health behavior towards the COVID-19 pandemic in Bangladesh: A web-based cross-sectional study | 1808 respondents | Pearson's correlation analyses | Facebook, YouTube | Most of the users were students (63 percent, 1131 of 1808). The most popular sources were social media (53%) and television (44%) (959/1808). |
| Citizens' Initiatives for Crisis Management and the Use of Social Media: An Analysis of COVID-19 Crisis in Bangladesh | Various Facebook groups. | Netnography | Facebook | People are using social media to address the crisis. |
| COVID-19-Related Infodemic and Its Impact on Public Health: A Global Social Media Analysis | COVID-19 Information Retrieval Reports online. | Descriptive analysis of the  quantitative data | Facebook, Twitter | 2,311 rumour, stigma and conspiracy theories reports in 25 languages from 87 countries have been identified. |
| Creative social media use for Covid-19 prevention in Bangladesh: a structural equation modeling approach | 265 Bangladeshi people | Online survey | WhatsApp, Facebook, YouTube,  Imo, We Chat, Twitter, LinkedIn, and Instagram | Creative social media use enhances internet knowledge of Covid-19 precautions. |
| Community people preparedness and response on prevention and control of covid-19 best practice in bangladesh | 300 patients and their attendants were interviewed. | Survey | Not specified |  |
| Prevalence and Associated Factors of Problematic Smartphone Use During the COVID-19 Pandemic: A Bangladeshi Study | 601 students. | A cross-sectional survey | Facebook, WhatsApp,  etc. | Around 86.9% of students were problematic smartphone users. |

Table 6: Features of physical health related papers

Apart from mental health, physical health also came as an important area of research. The survey was the most followed method of this area. Besides the survey, some studies reviewed newspaper reports and even interviewed covid patients.

**3.8 Feature of ‘‘other’’ papers**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Headline | Data | Method | Types of social media | Finding |
| Public libraries' responses to a global pandemic: Bangladesh perspectives | interviews with eight librarians. | The study used a combination of quantitative and qualitative approaches.  (Mixed method) | Not specified | Most of the libraries were unprepared for a crisis. |
| Knowledge, Attitude, Practice, and Fear of COVID-19: an Online-Based Cross-cultural Study | I1296 participants. | Online survey | Facebook, Messenger,WhatsApp, and Skype | Fear and knowledge were not correlated. |
| Knowledge, attitudes, and preventive practices toward the COVID-19 pandemic: an online survey among Bangladeshi residents | 1765 Bangladeshi adults | cross-sectional survey | Not specified | In terms of infection prevention practices, 96.6% wore masks outside the home and 98.7% washed their hands with soap on their return. |
| Knowledge, attitudes, and practices related to the COVID-19 pandemic among Bangladeshi youth: a web-based cross-sectional analysis | 707 survey participants | A cross-sectional survey |  | Participants collected information on COVID-19 largely through social media (70.4%). |
| Knowledge, attitude, and practice regarding COVID-19 outbreak in Bangladesh: An online-based cross-sectional study | Of the 2017 survey participants, | Online survey | Many | 48.3 percent of participants possessed more accurate knowledge. |
| Responsible Factors of Panic Buying: An Observation from Online Media Reports | Reports related to panic  buying. | The study examined media stories on panic buying. | Not specified | In 93 nations, panic buying was observed.  Around 75% of responses said that a sense of scarcity was a significant influence. |
| Genomics, social media and mobile phone data enable mapping of SARS-CoV-2 lineages to inform health policy in Bangladesh | genomics, Facebook "Data for Good", and three cell phone data. | Data analysis | Facebook | At the beginning of mid-2020, most (85%) of the sequenced isolates were Pango B.1.1.25 (58%) or B.1.1 (19%). |

Table 7: Feature of ‘‘other’’ papers

Table 7 shows the papers which are not related to major areas. In these papers, different areas were examined. Issues related to the environment to use of library came as a topic of research. The survey method was the most used.

1. **Discussion and conclusion**

The study found mental health and misinformation are the two key areas of research among the selected articles. In contrast, the policy-based paper came as the least researched area. The finding signifies Bangladeshi people suffered from different mental disorders like anxiety, fear, trauma, depression due to Covid-19. For evidence, a research found that around 15% of Bangladeshi students experienced severe depression (Asaduzzaman Khan, Uddin, & Islam, 2019). Among papers, we found only two papers related to policy. One paper relates to health policy while the other paper discusses education policy.

The paper found that a wide variety of research approaches have been used in these papers. Apart from research methodologies of social science, the methods of natural science are also used. A few papers used hybrid methodology too. The survey came as the most used methodology. It signifies that due to the lockdown situation the opportunity for face-to-face data collection was limited. Thus, the online survey method was found most common method among researchers**.**Besides, content analysis method was also used significant amount of research. The content of social media, newspaper reports and videos have been analyzed both quantitatively and qualitatively**.**

To investigate the usage of social media, the paper found that social media used various ways. Firstly, survey questionnaires were distributed through social media sites among respondents. Secondly, Covid- related posts from different social media platforms were retrieved and analyzed in much research.

Regarding authorship MAMUN MA, ISLAM MS, SIKDER MT came as top authors in this field accordingly. MA published 6 papers and received the highest number of citations among the authors. ISLAM MS, SIKDER MT published five and four papers respectively.

When comparing our results to older studies, it pointed out that most of the previous review papers discussed mainly reviews the papers on mental health. For example, Mamun (2021b)reviewed 9 papers related to suicide and suicidal behavior in the context of Bangladesh. In contrast, our paper is not limited to only mental health related papers, rather we investigate all Covid related papers on Bangladesh that used social media at any point. So, the range of research is broader in our study.

Similarly, while Mamun(2021)reviews seven articles on mental health issues during the pandemic, we analyzed 50 articles including the papers on mental health. Thus, our finding is based on a greater data.

At the international levelBanerjee(2020)reviewed 13 papers related to Covid-19 from south Asian countries. Although the paper includes social media, it is only limited to mental health. But, we took papers from almost all areas.

One of the strengths of our study is that it covered the highest number of studies and analyzed data by both software and manually.

Limitations: The main limitation of our study is that we can not include papers from Bangladeshi local journals which are not indexed under the web of science database. As we analyzed our data firstly by using the bibliometric package, it only supports papers from databases like the web of science, Scopus or Publon. So, it was impossible to include articles that are related to our area but published in the Bangla language or published in those journals which are not listed on the databases mentioned before.

Our results open an exciting new avenue of study focused on social media and covid-19. We research the context of Bangladesh; similar research could be done in other countries in South Asia or beyond. Moreover, as we could not include articles from local journals of Bangladesh, one could initiate a new investigation about these articles and can imitate our methodology and framework. Similarly, there could be more research to explore the impact and role of social media in other fields in the context of Bangladesh.

Additionally, as our study found misinformation is one of the key research areas and there were many publications on this issue, more research could be conducted in this area. So far,

We found similar studies where the role of social media was investigated in the field of tourism and public health Asaduzzaman Khan et al., 2019 ; T. Rasul & Hoque, 2020 .Our study will contribute to understand the dynamist of research related to covid-19 and social media.

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