Evaluation the COVID-19 related posts of the Official Facebook Page of the World Health Organization

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ABSTRACT

Objective: This study aims to analyze the COVID-19-related posts on the official Facebook page of the World Health Organization (WHO). Specifically, we aim to evaluate the engagement metrics such as views, comments, shares, and reactions received by categorized posts. Additionally, we seek to identify the topics that generate the highest levels of engagement in terms of comments and sharing reactions.

Material and Methods: This retrospective observational research project was designed to evaluate COVID-19-related posts on the official WHO Facebook Page between March 15, 2020, and March 15 2021. The data was analyzed using IBM SPSS Statistics 25.0.

Result: 2021 COVID-19-related posts on the Official Facebook Page of the WHO (n=877) were examined. 23.7% of the shares were about protective equipment, 22.2% were about the pandemic, 12.6% were about personal protective equipment, 11.5% were about social distancing, and 10.3% were media briefings. It was observed that they were about COVID-19??, 9.9% were about syndemic, 6.5% were about vaccine, 1.9% were about medicine, 0.9% were about mutation. An examination of posts related to drugs, vaccines, and media briefings revealed that the most prevalent response was 'like'. Statistical analysis indicated that the number of 'like' reactions was significantly higher for vaccine-related posts compared to non-vaccine related posts. Conversely, the number of angry reactions was lower for vaccine-related posts than for non-vaccine related posts.

Conclusion: This study provides valuable insights into the engagement patterns of COVID-19-related posts on the official Facebook page of the World Health Organization (WHO). Our analysis highlights the prevalence of topics such as protective equipment, the pandemic, personal protective equipment, social distancing, and media briefings among the examined posts. Notably, vaccine-related posts garnered a significantly higher number of 'like' reactions compared to non-vaccine related posts, underscoring the importance of vaccine-related communication efforts. These findings emphasize the significance of accurate and informative content dissemination by authoritative institutions like the WHO during global health crises such as the COVID-19 pandemic.

Keywords: COVID-19, WHO, Facebook, Social Media

INTRODUCTION

The coronavirus disease 2019 (COVID-19) causes a severe respiratory illness similar to severe acute respiratory syndrome. Phylogenetic analysis shows that COVID-19 is a new member of the Coronaviridae family, distinct from severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV). Typical symptoms of COVID-19 include cough, shortness of breath, sore throat, fatigue, and most commonly, fever that appears shortly after exposure to an infected person. It can lead to pneumonia and severe illness, particularly in the elderly. (1)

Information about COVID-19, while challenging to acquire and assess in terms of timeliness and accuracy, is indispensable for both the public and the scientific community. It plays a vital role in efforts to mitigate and enhance our understanding of the disease.

Among the general population, the internet serves as the most popular source of information regarding the etiology and intervention models of medical conditions. Since the outbreak of COVID-19, medical information on traditional and social media has rapidly increased. A recent study spanning twenty-one countries revealed a surge in Google searches for "wash hands" corresponding to the escalation of COVID-19 transmission (2). Regrettably, misinformation regarding COVID-19 is spreading rapidly on the internet, particularly on social media platforms (3).

Research in social media has investigated previous outbreaks and pandemics, such as Zika, H1N1, and Ebola. These studies have encompassed descriptive analysis of posting frequency, thematic analysis of post content, sentiment analysis of posts, and social network analysis (4, 5, 6). The WHO has provided guidelines for emergency risk communication during outbreaks. However, countries may adopt different strategies when communicating health risks on social media platforms. Currently, there is a lack of studies comparing the social media engagement efforts of public health officials from different countries, and the corresponding general public reactions and interactions. Such studies could provide valuable insights into the effective use of platforms like Facebook for risk communication (7).

Many scientists have compared COVID-19 to the severe acute respiratory syndrome (SARS) outbreak of 2003. However, the world we live in is very different from the world during the 2003 SARS epidemic, as social media has developed and now plays a much larger role in our lives compared to two decades previously. Social media has been a valuable tool for both healthcare organizations and healthcare professionals for over a decade, enabling them to connect with at-risk individuals, improve the health literacy of the general population, and enhance health outcomes (8, 9). As a result, after emergence of the COVID-19 pandemic, the features and capabilities of social media became more prominent; it can direct people to reliable sources, counter misinformation, provide connections and psychological support, advance remote learning, and even accelerate research efforts (10). Moreover, social media also assists in disclosing any early warning signals to the public when an outbreak starts. Furthermore, data gathered from internet research, particularly on social media, aids medical experts and scientists in predicting and anticipating outbreaks (11, 12).

As part of its efforts to promote accurate information over misinformation, the World Health Organization (WHO) has created and disseminated shareable information graphics that debunk specific myths about COVID-19. Research shows mixed results regarding the effectiveness of health organizations' websites designed to debunk misinformation. However, previous studies have reported the effectiveness of observational corrections, where individuals update their attitudes in response to seeing misinformation corrected on social media for emerging infectious disease topics like the Zika virus and influenza (13, 14)

Pandemics can exert substantial impacts on the economy and precipitate social and political disruptions. Robust public health infrastructures, exemplified by organizations like the Centers for Disease Control and Prevention (CDC), are essential to ensure preparedness for public health measures

and to orchestrate emergency interventions. Moreover, they play a crucial role in identifying and addressing information gaps. The effects of the pandemic can be analyzed under three categories: societal, psychological, and economic (15).

The COVID-19 pandemic has undoubtedly been a decisive event in both economic and social aspects, as well as politically. The social costs triggered by the pandemic and the necessary social distancing measures, including mandatory quarantines in many countries, have had significant mental and physical effects. Since the onset of coronavirus quarantines, an increase in domestic violence has been recorded in many countries (16), and also expected are other mental health-related side effects in the population, including a sharp rise in suicide rates (15).

The aim of this study is to examine the COVID-19-related posts on the official Facebook page of the World Health Organization (WHO), analyze the number of views, comments, shares, and reactions of classified posts, and identify the topics attracting the most attention in terms of comments and shares.

MATERIAL and METHODs

Data Collection

In this retrospective observational study, the data consist of COVID-19-related posts (n=877) made on the WHO Official Facebook Page between March 15, 2020, and March 15, 2021. The data were collected through the scanning of the WHO Official Facebook page between March 15 and March 31, 2021, followed by thematic analysis. In the first step, all posts were read, and an initial set of codes was created. Then, similar codes were combined into clusters and organized into analytical themes/categories.

The author classified the topics of the posts (videos and visuals) under nine main headings: Press Release, Vaccination, Mutation, Pandemic, Syndemic, Personal Protective Equipment, Social Distancing, Medication, and Preventive Healthcare Service. Then, the author scrutinized the interactions associated with the categorized posts, encompassing views, comments, shares, and reactions (such as like, heart, smile, anger, surprise, sadness, love), along with the focus of comments and shares. The first chronologically posted repeated content was included in the study. A post's content could be classified under more than one topics.

RESULTS

The analysis of the posts revealed the following distribution of posts: 10.3% (n=125) were related to media briefings, 6.5% (n=79) to vaccinations, 0.9% (n=12) to mutations, 22.2% (n=267) to the pandemic, 9.9% (n=120) to syndemics, 12.6% (n=152) to personal protective equipment (PPE), 11.5% (n=139) to social distancing, 1.9% (n=23) to medication, and the largest proportion, 23.7% (n=285), to preventive equipment. Based on the results, it was found that posts related to preventive equipment garnered the highest number of shares, constituting 23.7% of the total, followed by pandemic-related posts, which accounted for 22.2% of shares (**Table 1**).

Table 1: The analysis of the posts

POSTS	n	%
Preventive Equipment	285	23.7
The Pandemic	267	22.2
Personal Protective Equipment	152	12.6
Social Distancing	139	11.5
Media Briefings	125	10.3
Syndemics	120	9.9
Vaccinations	79	6.5
Medication	23	1.9
Mutations	12	0.9
Others	6	0.5

Tablo 2: Media briefing posts

POSTS	n	%
Pandemic-Related Posts	1828484	32.49
Media Briefing Posts	1451690	25.8
PPE-Related Posts	1115072	19.81
Social Distancing-Related Posts	942608	16.75
Syndemic-Related Posts	538233	9.56
Vaccination-Related Posts	528305	9.38
Preventive Equipment	130415	2.31
Mutation-Related Posts	130204	2.31
Medication-Related Posts	99321	1.76

(Note that a post may be classified as in more than one topic)

Regarding media briefing posts, comments for this topic accounted for 25.8% (n=1451690) of the total comments, shares accounted for 17.85% (n=2398787) of the total shares, and views accounted for 6.39% (n=357055700) of the total views. It was found that most interactions (comments, shares, views) were generated from comments for media briefing posts.

For vaccination-related posts, comments for this topic accounted for 9.38% (n=528305) of the total comments, shares accounted for 5.98% (n=804409) of the total shares, and views accounted for 6.93% (n=3386766902) of the total views. Similar to media briefing posts, the highest number of interactions for vaccination posts was from comments.

For mutation-related posts, comments accounted for 2.31% (n=130204) of the total comments, shares accounted for 1.74% (n=234128) of the total shares, and views accounted for 1.58% (n=88229000) of the total views. Again, comments had the highest level of interaction for this topic.

The analysis of posts related to the pandemic showed that comments accounted for 32.49% (n=1828484) of the total comments, shares accounted for 31.77% (n=4270033) of the total shares, and views accounted for 19.05% (n=1062921671) of the total views. As with previous topics, comments had the highest level of interaction for this topic.

For syndemic-related posts, comments accounted for 9.56% (n=538233) of the total comments, shares accounted for 11.93% (n=1604277) of the total shares, and views accounted for 6.02% (n=1336177344) of the total views. In this case, shares had the highest level of interaction for this topic.

For PPE-related posts, comments accounted for 19.81% (n=1115072) of the total comments, shares accounted for 30.53% (n=4102903) of the total shares, and views accounted for 23.96% (n=1337253820) of the total views.

Like the previous topic, shares had the highest level of interaction for this topic.

Regarding social distancing-related posts, comments accounted for 16.75% (n=942608) of the total comments, shares accounted for 2.40% (n=3231610) of the total shares, and views accounted for 19.51% (n=1088775620) of the total views. Similar to other topics, comments had the highest level of interaction for this topic.

For medication-related posts, comments accounted for 1.76% (n=99321) of the total comments, shares accounted for 2.06% (n=277127) of the total shares, and views accounted for 0.74% (n=41494100) of the total views. As with the majority of topics, comments had the highest level of interaction for this topic .

For the posts related to preventive equipment, comments accounted for 2.31% (n=130415) of the total comments, shares accounted for 36.43% (n=4896713) of the total shares, and views accounted for 16.91% (n=943935540) of the total views. Similar to PPE-related posts, shares had the highest level of interaction for preventive equipment-related posts.

Furthermore, a positive and strong correlation was found between the total number of comments and the total number of shares (r=0.581, p<0.01), total number of comments and the total number of views (r=0.254, p<0.01), and the total number of shares and the total number of views (r=0.358, p<0.01).

Regarding the use of emojis on medication-related posts, 96.12% (n=3651657) of these used were like reactions, followed by 1.73% (n=65827) heart reactions, 0.98% (n=37399) smile reactions, 0.17% (n=6731) angry reactions, 0.21% (n=8262) confused reactions, 0.35% (n=13634) sad reactions, and 0.4% (n=15252) loving reactions.

For media briefing-covid19-related posts, 90.84% (n=9144846) of the emojis used were like reactions, followed by 5.44% (n=548604) heart reactions, 0.50% (n=50555) smile reactions, 1.97% (n=198594) angry reactions, 0.32% (n=32424) confused reactions, 0.51% (n=51563) sad reactions, and 0.39% (n=39737) loving reactions.

In posts related to vaccinations, 96.45% (n=19176226) of the emojis used were like reactions, followed by 1.95% (n=389630) heart reactions, 0.49% (n=98716) smile reactions, 0.24% (n=48804) angry reactions, 0.17% (n=34101) confused reactions, 0.39% (n=78952) sad reactions, and 0.27% (n=54283) loving reactions.

In posts related to vaccines, statistically significant differences were observed in the numbers of like reactions and angry reactions. Vaccine-related posts received a higher number of like reactions and a lower number of angry reactions compared to posts on other topics. Additionally, statistically significant differences were found in the number of smile reactions for vaccine-related posts; these posts received a higher number of smile reactions compared to others. However, no statistically significant difference was found in the number of heart reactions between posts with vaccine-related content and those without. Regarding media briefing-COVID-19 posts, no statistically significant differences were found among the numbers of like, angry, heart, or smile reactions.

DISCUSSION

COVID-19 infection caused a significant number of hospitalizations in the early months of 2020. The World Health Organization (WHO) declared it a "global health emergency." (17). Not long after, the public not only began contributing related content to social media but also started using it as a tool to search for health information and related news worldwide. As a result, social media became inundated with an enormous amount of information related to the virus. Posts range from individual preventive measures (such as the effectiveness of masks in controlling transmission) to treatment availability (such as reports on hydroxychloroquine). (18).

This process led to an explosion in the amount of uncontrolled information available, and the spread of misinformation. This underlines the importance of the role of institutions such as the WHO in providing accurate information by institutions. To the best of our knowledge, our research is the first study that examines COVID-19-related posts on the World Health Organization's Official Facebook Page.

In this retrospective observational study, the data comprised COVID-19-related posts (n=877) on the WHO Official Facebook Page. The posts were categorized as follows: 23.7% were about protective equipment, 22.2% about the pandemic, 12.6% about personal protective equipment, 11.5% about social distancing, 10.3% media briefings related to COVID-19, 9.9% about syndemics, 6.5% about vaccines, 1.9% about drugs, and 0.9% about mutations. According to the results, posts related to protective equipment received the highest share of interactions, with 23.7%, making them the most shared posts, followed by pandemic-related posts, accounting for 22.2%. During the pandemic, the WHO

became a crucial source of accurate public information on these topics.

The study by Ahmad et al. (18) involved a total of 454 posts related to COVID-19 on Facebook. Among these posts, 130 (19.9%) were from health institutions, 114 (17.4%) from news organizations, 30 (4.6%) from NGOs, 12 (1.8%) from governments, and the remaining 156 (23.9%), from the unofficial accounts of individuals and groups. It was observed that unofficial individuals/groups (156; 23.9%) published the most content, playing a significant role in disseminating information about different aspects of COVID-19. Studies evaluating Facebook posts in general are limited, and we could not identify any other study directly evaluating WHO Facebook posts.

There is a positive and significant relationship between the total number of comments, shares, and views, and also between the total number of shares and views.

Regarding posts related to drugs, it was observed that 96.12% of the reactions were likes, followed by 1.73% hearts, 0.98% smiles, 0.17% angry reactions, 0.21% confused reactions, 0.35% sad reactions, and 0.4% heart reactions.

Similarly, for media briefing posts, 90.84% of the reactions were likes, followed by 5.44% hearts, 0.5% smiles, 1.97% angry reactions, 0.32% confused reactions, 0.51% sad reactions, and 0.39% heart reactions.

For posts related to vaccines, 96.45% of the reactions were likes, followed by 1.95% hearts, 0.49% smiles, 0.24% angry reactions, 0.17% confused reactions, 0.39% sad reactions, and 0.27% heart reactions.

It was discovered that the number of likes for vaccine-related posts was significantly higher compared to posts without vaccine-related content. Additionally, the number of angry reactions to vaccine-related posts was significantly lower compared to other posts. Moreover, the number of smile reactions for vaccine-related posts was significantly higher compared to other posts. However, there was no significant difference in the number of likes, hearts, angry reactions, and smile reactions for posts related to drugs and media briefing COVID-19 posts.

Studies conducted by Şahin and Ayaz (19) investigated posts within Facebook groups during the COVID-19 pandemic. Their analysis of 600 main messages and comments revealed a total of 353 likes. Additionally, the content encompassed 120 sad reactions, 54 prayers, 4 broken hearts, 1 surprised face, and 1 heart emoji. Moreover, the posts comprised 40 photos/videos, 1 link, and 1 hashtag. The photos included test results, films, and medicine boxes, among other items. It's worth noting that this study differs from our research in terms of methodology, as it focuses on general posts rather than posts from health authorities such as the WHO.

A study by Xun et al. (20) found that medical groups received more user engagement, with an average of 502 reactions and 224 comments per post, while ordinary individuals' posts have only 182 reactions, (SD 265), and 104 comments, (SD 207) (P < .01). This suggests that posts from health authorities such as the WHO have a wider reach.

Recent studies evaluating the benefits of information sharing on social media have focused on the negative effects,

including the rapid spread of misinformation (21-23). This spread, however, is not specific to the COVID-19 pandemic, and previous research reported that only 53% of medical professionals' health-related Twitter posts were supported by medical evidence. This highlights the broader issue of misinformation and the importance of critically evaluating information shared on social media, especially for health-related topics. Social media platforms play a significant role in disseminating information, and users need to be vigilant and seek out reputable sources for accurate and evidence-based information (23). Additionally, research on social media posts related to the 2014 Ebola outbreak also reported a similar rate of misinformation. Like the COVID-19 pandemic, the Ebola outbreak was accompanied by a significant amount of false and misleading information spread through social media platforms. This highlights the recurring pattern of misinformation during public health crises, and the need for ongoing efforts to address and counteract false information on social media (21, 22). Our study, on the other hand, is based on the analysis of WHO (World Health Organization) posts, focusing on accurate and reliable information. We selected WHO's social media posts in line with our aim of assessing the dissemination of credible information during the COVID-19 pandemic. This approach allows us to highlight the importance of trustworthy sources, such as official health organizations, in providing accurate information to the public during health crises.

Ahmed et al.'s study (18) consisted of 454 Facebook posts, with 22.5% from verified accounts, and 23.9% from unofficial individual/group accounts. The majorities (40.4%) of the posts were associated with credible sources of COVID-19 information, and the most common topic (43.9%) was medicine/public health. However, overall, 22.3% of the posts contained misinformation, and a further 19.6% were unverifiable, while only 27.5% contained fully accurate information that WHO or CDC could confirm.

Social media has become crucial for disseminating important information to the public, including governments, organizations, and universities. Facebook, a key social media platform, can effectively be utilized to communicate health information to the general public during a pandemic. Emerging infectious diseases like COVID-19 often lead to the general public's increased usage and consumption of all media types for information. Therefore, social media plays a significant role in people's perception of disease exposure and decision-making, ultimately influencing risky behaviours. However, the information on social media is user-generated, and can be subjective or inaccurate, often includings false information and conspiracy theories. Hence, it is crucial to ensure that public information about emerging threats like SARS-CoV-2 is both accurate and timely (24). Therefore, the use of social media by the WHO to disseminate reliable information to the public is a vital contribution to the proper management of a pandemic.

CONCLUSION

During crises, the utilization of social media escalates, presenting an opportunity for leaders and public officials to communicate effectively, thereby mitigating public panic and fostering trust. In contemporary society, the cultural and symbolic significance of social media can be leveraged by health authorities to facilitate interpersonal and group interactions, ultimately reducing uncertainty and fear (25). Public health organizations and governments must prioritize the dissemination of accurate information on social media platforms to effectively combat misinformation. Given its growing influence in policy announcements and health education, it is imperative to harness this tool to inoculate the public against waves of false information (26-29).

When a disease such as COVID-19 starts spreading and causing negative emotions, there is a need for timely, appropriate, and effective risk communication, especially through social media, to help alleviate concerns or negative attitudes. Government interventions delivered through social media have become increasingly important in combating information pandemics and promoting accurate and reliable information for the public. However, research on the effectiveness and efficiency of these official responses in influencing public beliefs or behaviour changes is currently very limited. Additionally, it is not yet known whether government posts will reach more social media users or have a greater impact on them than information pandemics (30-33).

According to the results obtained in this study:

• The posts related to protective equipment received the highest percentage of shares, accounting for 23.7% of the total.

• The second most shared topic was the pandemic itself, with 22.2% of the total shares.

• There is a positive and significant correlation between the total number of comments, total shares, and total views.

• There is a positive and significant correlation between the total number of shares and the total number of views.

• Regarding posts related to medication:

The highest proportion of reactions was "like," accounting for 96.12%.

For posts related to media briefings:

The most common reaction was also "like," with 90.84%.

For posts related to vaccines:

The most common reaction was "like," with 96.45%.

• The number of "like" reactions for vaccine-related posts was significantly higher than for posts on other topics.

• The number of "angry" reactions for vaccine-related posts was significantly lower than for posts on other topics.

• The number of "smile" reactions for vaccine-related posts was significantly higher than for posts on other topics.

• There were no significant differences in the number of "like," "heart," "angry," and "smile" reactions for posts related to medication and for those related to media briefing-COVID-19 posts.

This study, which examines Facebook posts from the World Health Organization (WHO) during the pandemic, has the potential to make a significant contribution to the literature, and it is the first study conducted in this field. Evaluating the

posts on the Facebook page of a reputable organization such as the WHO, which can provide up-to-date and accurate information about the COVID-19 pandemic, will serve as a guiding example for future studies under the current circumstances. The study highlights the importance of the WHO's informationbeing well-received by the public during the pandemic, and it emphasizes the need for further research in this area to better understand the impact of social media in disseminating reliable health information during global health crises.

Limitations

In this study, the data analyzed was taken from the WHO's Facebook page only, , rather than from other social media platforms such as Twitter and YouTube. Therefore, the findings of this study may not fully represent the WHO's overall social media outreach efforts during the COVID-19 outbreak. Additionally, the emotions captured in Facebook comments do not necessarily reflect the user profiles of other social media platforms, as it is known that different platforms attract different user demographics.

Furthermore, the WHO may simultaneously be using traditional news and mass communication channels to reach the public with information, updates, and guidance measures. Therefore, the social media efforts of the WHO are complementary, and these platforms may be seen either as additional sources of information, or as a means to reach individuals who no longer follow traditional news and mass communication channels.

Another limitation is that this study is cross-sectional. Social media content is in a constant state of flux, so the number of posts or interaction activity may be changing even while the research teams are accessing the data.

REFERENCES

1. Zhai P, Ding Y, Wu X, Long J, Zhong Y, Li Y. The epidemiology, diagnosis and treatment of COVID-19. Int J Antimicrob Agents. 2020;28:105955.

2. Lin Y, Liu C, Chiu Y. Google searches for the keywords "wash hands" predict the speed of national spread of COVID-19 outbreak among 21 countries. Brain Behav Immun. 2020;10:1-3.

3. Bastani P, Bahrami M. COVID-19 related misinformation on social media: a qualitative study from Iran. J Med Internet Res. 2020;05:1-5.

4. Vijaykumar S, Meurzec R, Jayasundar K, Pagliari C, Fernandopulle Y. What's buzzing on your feed? Health authorities' use of Facebook to combat Zika in Singapore. J Am Med Informatics Assoc. 2017;24 (6):1159.

5. De Araujo DHM, De Carvalho EA, Da Motta CLR, Da Silva Borges MR, Gomes JO, De Carvalho PVR. Social networks applied to Zika and H1N1 epidemics: a systematic review. Springer, Cham 2019;679.

6. Strekalova Y A Health risk information engagement and amplification on social media. Health Educ Behav. 2017;44(2):332-339.

7. Raamkumar AS, Tan SG, Wee HL. Measuring the outreach efforts of public health authorities and the public response on Facebook during the COVID-19 pandemic in early 2020: cross-country comparison. Journal of medical Internet research. 2020;22(5), e19334.

8. Lister C, Royne M, Payne HE, Cannon B, Hanson C, Barnes M. The Laugh Model: Reframing and Rebranding Public Health Through Social Media. Am J Public Health. 2015;105(11):2245-2251.

9. Novillo-Ortiz D, Hernández-Pérez T. Social media in public health: an analysis of national health authorities and leading causes of death in Spanish-speaking Latin American and Caribbean countries. BMC Med Inform Decis Mak. 2017;03;17(1):16.

10. Zhu Y, Fu K, Grépin KA, Liang H, Fung IC. Limited Early Warnings and Public Attention to Coronavirus Disease 2019 in China, January-February, 2020: A Longitudinal Cohort of Randomly Sampled Weibo Users. Disaster Med Public Health Prep. 2020;03:1-4.

11. Li LZ, Wang S. Prevalence and predictors of general psychiatric disorders and loneliness during COVID-19 in the United Kingdom. Psych. Res. 2020;291:0165–1781.

12. Li C, Chen LJ, Chen X, Zhang M, Pang CP, Chen H. Retrospective analysis of the possibility of predicting the COVID-19 outbreak from Internet searches and social media data, China, 2020. Euro Surveill. 2020;25(10):1.

13. Vraga EK, Bode L. I do not believe you: how providing a source corrects health misperceptions across social media platforms. Inf Commun Soc. 2018;21:1337–1353.

14. Bode L, Vraga EK. See something, say something: correction of global health misinformation on social media. Health Commun. 2018;33:1131–1140.

15. Schwandt H, Von Wachter T. Socioeconomic Decline and Death: Midlife Impacts of Graduating in a Recession, NBER Working Paper, 2020;26638.

16. World Health Organization. Novel Coronavirus (2019-nCoV) (2020). Situation Report - 46. Geneva: WHO.

17. Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. JAMA. 2020;7:1239-1242.

18. Ahmed N, Shahbaz T, Shamim A, Khan KS, Hussain SM, Usman A. The COVID-19 infodemic: a quantitative analysis through Facebook. Cureus. 2020;12(11).

19. Sahin E, Ferihan A. Bir sağlık arama davranışı olarak sosyal medya kullanımı: izolasyon, karantina ve sosyal mesafe tedbirlerinde Facebook'ta Covid-19 içerikli sosyal medya paylaşımlarının görünümü. Connectist: Istanbul University Journal of Communication Sciences, 2021;60:185-215.

20. Xun H, He W, Chen J, Sylvester S, Lerman S, Caffrey J Characterization and Comparison of the Utilization of Facebook Groups Between Public Medical Professionals and Technical Communities to Facilitate Idea Sharing and Crowdsourcing During the COVID-19 Pandemic: Cross-sectional Observational Study. JMIR Formative Research. 2021;5.4:e22983.

21. Fleenor JW. The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economics, Societies and Nations. Personnel Psychology. 2006;59(4):982-985.

22. Woolley AW, Chabris CF, Pentland A, Hashmi N, Malone TW. Evidence for a collective intelligence factor in the performance of human groups. Science. 2010;29;330(6004):686-688.

23. Krause J, Ruxton GD, Krause S. Swarm intelligence in animals and humans. Trends Ecol Evol. 2010;25(1):28-34.

24. Al-Dmour H, Salman A, Abuhashesh M, Al-Dmour R. Influence of social media platforms on public health protection against the COVID-19 pandemic via the mediating effects of public health awareness and behavioural changes: integrated model. Journal of medical Internet research. 2020;22(8), e199.

25. Erinç ZÖ, Eliaçık K, Ince G, Öztürk YK, Elmalı F, Emir B, Helvacı M. Understanding vaccine hesitancy: social isolation in relation to social media addiction and COVID-19 anxiety. Cureus. 2022;14(9).

26. Anderson RM, Heesterbeek H, Klinkenberg D, Hollingsworth TD. How will country-based mitigation measures influence the course of the COVID-19 epidemic? Lancet. 2020;395:931–4.

27. Kaye A D, Okeagu CN, Pham AD, Silva RA, Hurley JJ, Arron BL, Cornett EM. Economic impact of COVID-19 pandemic on healthcare facilities and systems: International perspectives. Best Practice & Research Clinical Anaesthesiology. 2021;35(3), 293-306.

28. Merchant RM, Lurie N. Social Media and Emergency Preparedness in Response to Novel Coronavirus. JAMA. 2020;23:201.

29. Wang Y, McKee M, Torbica A, Stuckler D. Systematic Literature Review on the Spread of Health-related Misinformation on Social Media. Soc Sci Med. 2019;240:112552.

30. Tsao SF, Chen H, Tisseverasinghe T, Yang Y, Li L, Butt ZA. What social media told us in the time of COVID-19: a scoping review. The Lancet Digital Health. 2021;3(3), e175-e194.

31. Garfin D, Silver R, Holman E. The novel coronavirus (COVID-2019) outbreak: amplification of public health consequences by media exposure. Health Psychol. 2020;May;39(5):355-357.

32. Sutton J, Spiro E, Butts C, Fitzhugh S, Johnson B, Greczek M. Tweeting the spill: Online informal communications, social networks, and conversational microstructures during the Deepwater Horizon oilspill. Int J Inform Syst Crisis Resp Manag. 2013;5(1):58–76.

33. Kouzy R, Abi Jaoude J, Kraitem A, El Alam MB, Karam B, Adib E. Coronavirus Goes Viral: Quantifying the COVID-19 Misinformation Epidemic on Twitter. Cureus. 2020; Mar 13-12(3):e72.