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# Health Fear Mongering Make People more Sicker: Twitter Analysis in the context of Corona Virus Infection

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**Abstract.** The purpose of this study is to assess the fear factor in Social media data in the context of Coronavirus Disease - 2019(COVID-19) across the globe. The fear generated from social media content will adversely affect the mental health of the public.

**Design/methodology/approach:** The study is followed by a literature survey during the emergence of social media and Internet technologies since the year 2006 where the people commonly started to use the internet across the world. The Twitter data collected on COVID-19 during the infection period and the analysis.

**Findings:** The social media contents adversely affect the mental health of the common public and also the healthcare programs run by the government organizations to some extent. The findings show that the social media are the major source of fear-mongering information and the people behind the fear-mongering are making use of the disaster situation to set their agenda. The strict enactment of law and the efforts by the social media platforms can reduce the fake news and misinformation.

**Research limitations/implications:** The research focuses only on the Twitter data for the analysis during the COVID-19 distress. The detailed study needs to be done in similar distress situations across the globe. The data retrieval became limited from different social media platforms because of privacy issues.

**Keywords:** Fear Mongering, fake news, misinformation, coronavirus, social media.

## 1 Introduction

The Corona Virus infection in China which was reported from Wuhan on December 31, 2019 was a deadly disease which took the lives of about one million people and more than 30 million people infected with the coronavirus as on September 25, 2020. The World Health Organization (WHO) started a link in their website named “Myth Busters” to tackle such issues. Whenever the search for coronavirus comes in a social media platform, the users will get a link to the “Myth Busters” on the WHO official website. Self-appointed experts, people work from anecdotes, or making wild claims to get traffic or notoriety[1] during this distress.

The blame game is in full swing between the superpowers like Russia, China and the United States[2]. Mass media are acting as the 'fear-blur' and short circuits the actual events and brings the fear factor at the forefront. COVID-19 was also created a situation where communalism and racism brought in front by masking the actual scenario of the epidemic spread[3,4]. The tweets in the social media in India utilized to target one particular community rather than the disease. The hash tags appeared as "#CoronaJihad" when many people attended the Tablighi Jamaat function held at New Delhi, India contracted with COVID-19[6].

The impact of the epidemic may worsen the situation by intensifying the fear and increase in the risk perception. Epidemics are naturally emotion laden and the news report with emotion laden reporting may affect the mental health of the reader and also the people affected[6,7]. The emotion laden news reporting increases the fear but may not educate about the epidemics[8]. The reporting style depends on the emotion attributed to the risk, i.e. the severity and its portrayal of the health risk in news coverage. The two threat components that influence the risk are perceived severity and the perceived vulnerability. Former is concerned with the seriousness or magnitude and the latter is concerned with the likelihood of the risk impact[9,10].

The factual reporting itself elicits emotional response and it is not solely attributed to the journalists reporting the news. That is beyond the control of the individual journalist. The audience response is also a subjective matter. The person well aware of the risk may not be affected much compared to the case of an individual naïve to the risk[11]. Sensational news which are evoking sensory and emotional arousal can induce increased risk perception[12]. Exemplification in news stories may strongly influence the audience perception[13]. The examples can be anecdotal evidence in news stories. The emotion evoking health news reporting may be expected to influence the behavioural response to the health contents[14]. The stigmatization and discrimination of victims in treatment may arouse fear among the reader[7].

Studies show that the emotion-laden reporting and the fear depend on the vulnerability also. If the emotion laden reporting of the news is from another far flung country, then the response in an individual is less[15]. Health professionals and scholars have reservations on the boosting hearsay and the misleading medical and scientific information[16]. The fear mongering is also used for political gain by utilizing the capital expenditure. The narrative of fear mongering is escalated in the mind of the public and justifies the implementation cost of the public expenditure for political gain. This may be otherwise done by educating the people and proving awareness to them without much loss to the public money in the long term.

The psychological impact of quarantine among the people affected and suspected to be affected will be huge in some cases. Social media has many versions of the isolation and quarantine. The people feared to be in an isolation ward and expected to spend time in isolation for a specified period may not disclose the disease[17]. The disease like COVID-19 imposes the quarantine for the people identified as the potential carriers of the disease or have contact with the infected individual[18,19,20, 21].

Fear mongering in media and public health campaigns use scaring tactics to enforce behavioural changes in the user. The fear mongering in the form of warnings and images in food materials, drugs, tobacco, etc. may not work normally. The studies

show that the fear mongering along with emotional messages may bring behavioral changes. The fear mongering combined with a message of hope influences the people in behavioral change[22,23,24,25].

The novel CoronaVirus(nCoV) that emerged in China has also brought viral misinformation in the social media and other media in cyberspace. The virality of misinformation and the rumors in social media is much faster than the spread of nCoV. The social media filled with the fear mongering posts on discrimination, racism and other hate contents [26].

## 2 Methodology

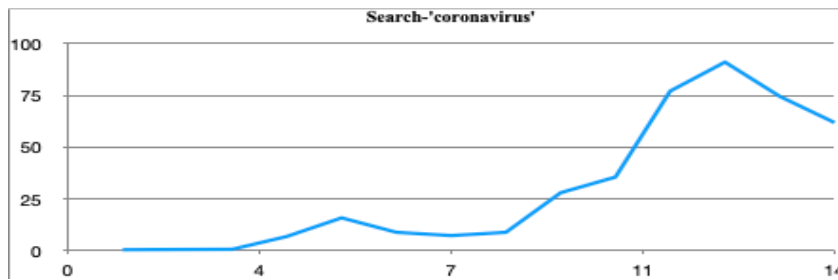
With the emergence of the COVID-19 from epidemic to Pandemic, we considered the articles related with corona, fear, epidemics and social media for the study. The social media platform like Twitter and Facebook is considered for the analysis of the data. The twitter data was collected using the R programming. Selected conversations are used to point out the type of discrimination and fake news that are spread through the social media. The major contribution of fake news and misinformation that are spreading through the social network groups meant for religion and the political parties. Most often the distress is related with the communal angle in such networking sites.

### 2.1 Google Trends

Google Trends is a website by Google which analyzes the popular search about various queries across the globe. Normally it assesses the current trending topics in the internet and the user has the option to compare different search keys. Google Trends shows that the search on ‘Corona Virus’ has the pattern of the virus infection across the globe. There are two peaks in the graph. Initial one is in the fifth week of the emergence when the infection was high in China and it faded for some time. Later it picked up as the infection spread across the globe. People normally are not bothered about when it occurs in China. Other countries did not take advance steps to tackle the situation. The situation became worse when it spread across Europe, Eastern Mediterranean region and region of Americas. Fig. 1 shows the trends of search in Google about ‘coronavirus’ from December 31, 2019 to April 5, 2020.

There were many other trending searches during this period. It includes the “Tablighi Jamaath” conference held in Delhi and the resulting spread of COVID-19 among the participants and the contacts with the participants. This had resulted in the surge of Islamophobia in India. Similarly with the onset of COVID-19 in China and its spread in Europe and America resulted in Sinophobia and the people from China were attacked in different parts of the world. The major search keys related with Sinophobia were “Hatred”, “Sinophobia”, “Fear” and “Racism” along with the normal keywords like Corona and related queries. Tablighi Jamaath related topics were mainly concentrated on “Hazrat Nizamuddin Aulia Darga”, “Spitting”, “Zabur”, “Muslim”, “Mosque” and “Muhammed”. The news about the spitting of people gathered

for Tablighi Jamaath is not cooperating with the health workers and they even spit over them and the surrounding had got much attention. This had created a hate against the Muslims in India[27].



**Fig. 1:** Google Trends of COVID-19 infection (Source: Data from Google Trends)

The major queries were on the symptoms and the details about the coronavirus. The breakout query was the corona and its spread in California. “the beer and corona” was another trending query during that period. Some other related queries included the “status of COVID-19 in different countries”, “death toll due to corona infection”, its “symptoms” and “the map of the corona infection across the globe”.

## 2.2 Twitter Data Analysis

Tweets from Twitter are accessible to the unregistered users also. Other social media platforms like Facebook allow only the registered users to read the messages. So Twitter allows a vast number of users to extract the data of their relevant topic and do research on the data and deduce the socio-economic and behavioural patterns of a particular group based on the analysis. The trending topic in Twitter can be obtained from the Twitter trending hashtags. Twitter has no reciprocated relationship unlike the Facebook relationships. The relationship is either directed or undirected. The life cycle of a particular tweet will be depending on the relevance of the topic at a particular time. Some tweets will be repeated when the similar kinds of the events happen. Twitter data is normally assessed based on the sentiment analysis of a particular topic of consideration using Artificial Intelligence or Natural Language Processing technologies [28,29,30,31]

Twitter data related to COVID-19 during January 28, 2020 to March 22, 2020 was collected for the analysis. The initial study of the tweets revealed that many tweets which are becoming viral and creating panic among the public. Normally, the health related information is negative in nature. The news reporting, social media posts, tweets are all contain the negative reports on death, sufferings of people infected and shortage of food, medicine and other essential materials. In addition to that, social media will also flood with the fake news and misinformation. This will impact the mental health of the people already with anxiety, fear and stress. Many factors are behind the emergence of fake news and misinformation spread in social media. The search keys for collecting the Twitter data are given in table 1. 230000 tweets were collected during this period for the analysis.

The twitter data is processed before subjecting to the sentiment analysis and the word extraction. The tweet extraction and processing is divided into following steps:

- i. Extracting tweets using Twitter Application Programming Interface
- ii. Cleaning the tweets by removing hyperlinks, special characters, hash tags, converting to lower case letters and numbers
- iii. Getting sentiment score for each tweet using the packages available in Comprehensive R Archive Network (CRAN)
- iv. Segregating positive and negative tweets for analysis

The keywords were selected based on the trending hashtags in Twitter and also the common slogan followed by different organizations across the globe. The main keywords which are commonly used were the “Social Distancing”, “Break the Chain”, “Stay Home” and “Flatten the curve”. These keywords were commonly used in all the media and some more country specific and virus specific keywords were also used to extract the data.

**Table 1: Search Keys for Twitter data collection**

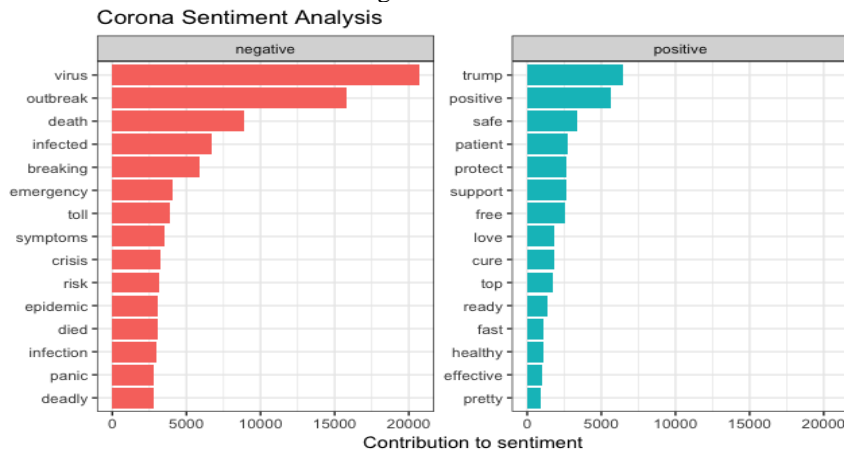
Tags used for data mining		
#TogetherApart	#nCoV	#lockdownindia
#socialdistancing	#2019-nCoV	#coronavirusindia
#StayHome	#Betacoronavirus	#CoronavirusLockdown
#FlattenTheCurve	#Wuhan	#21daysLockdown
#lockdownindia	#CoronavirusOutbreak	#CurfewInIndia
#जनता	#CoronaOutbreak	#COVID-19
#JantaCurfew	#BreakTheChain	#coronavirus
	#FightCOVID19	

First, the cleaning of the tweets is done to process further. Normally the tweets are collected and saved as different Comma Separated Files (CSV). They need to merge together for the processing. Initially the tweets are filtered by removing the hyperlinks, symbols like #, @, !, etc. , removing the stop words in English, numbers and then converting to lowercase. Now the texts in the tweets are ready for the analysis.

#### **Extraction of most frequent positive and negative words**

The health domain will be having the negative sentiment words in majority. The classification of positive and negative words is based on the Bing lexicon. Virus being the topic of research and the disease causing element, it is in the top most position and it has occurred more than 20000 times in the collected tweets. Most of the other words coming in the top position are closely related with the virus, its adjectives and the after effects after the viral infection. Most of the negative sentiments are related with fear and sadness. That is causing stress and anxiety among the user who is not well aware of the disease and topic he is dealing with. Fig. 2 shows the occurrence of most fifteen frequent negative and positive sentiment words extracted from the tweets collected. Compared to the frequency of negative sentiment words, the positive senti-

ment word frequency is very less. This can be seen in the figure 2. “Trump” is the most frequent positive word in the tweet and has occurred about 6000 times. The fake news needs to be viral to reach the intended user and the agenda set by one faction will be successful if the news reaches the maximum number of audiences. So they will use maximum negative sentiment in the tweet. As per the human behavior it is natural that he will be more interested in the rumors and spread it across. Thus the viral tweets in virtual world and the word of mouth in real world will have a huge impact. The authorized reports or the justification by the concerned authorities will reach the intended user at a later stage.

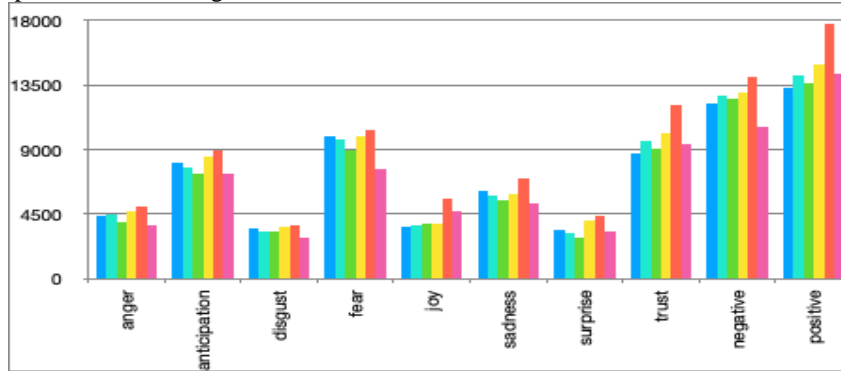


**Fig. 2:** Positive and negative sentiment words which are most frequently used in the tweets

### Sentiment Analysis

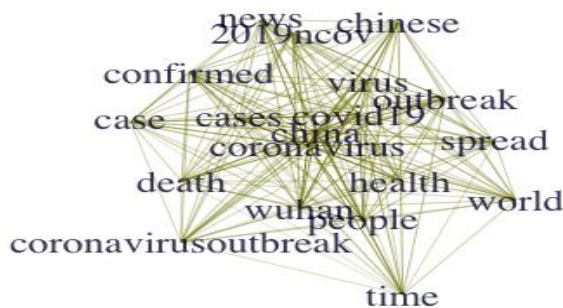
The sentiments analysis is done using the “syuzhet” package from CRAN. The “get\_nrc\_sentiment” package will return the sentiment values for the emotions. Normally the emotions are classified based on the grouping of English words in different emotion categories. The emotion categories are anger, anticipation, disgust, fear, joy, sadness, surprise, trust, negative and positive. Once we run the “get\_nrc\_sentiment” function, it will return values of different emotions. By assessing those values, we can deduce the type of tweets that are posted during a particular period. Fig. 3 shows the sentiment plot for the tweets collected during the COVID-19 incidents. The data is collected till March 22, 2020. The sentiment plot divided into six phases. For each emotion, there will be six values. We divided the period from January 28, 2020 to March 22, 2020 into six phases. This is done to analyze the sentiment of the COVID-19 as it progresses. Normally there will be increased tweets during the onset of an event and it will progress gradually. The agenda setting will be done in the initial phase to get the attention by the audiences. At the later stage government authorities will take necessary actions to prevent the spreading of rumour or fake news. So in the later stage the tweets relating to the agenda or rumour will die down and will be limited in number. We can see that the fear and anger is high in the initial phase and it is decreased in the final phase and in overall the fear got less value compared to trust.

The sentiment value is also calculated for each tweet and the overall averaged sentiment value is -0.035. It shows the overall sentiment of the tweets collected during the specified time is negative in nature.



**Fig. 3:** Sentiment scores during the period specified for data collection during different times

The analysis of sentiment shows that the negative sentiment tweets were decreased in the due course of time. The emotion, fear reduced in the final stages compared to initial stages. Instead of that the positive sentiment and the trust increased. That may be mainly due to the steps taken by the respective governments and the social media platforms in curbing the fake news and the misinformation. The social media groups were continuously alerted by the police department to refrain from posting and sharing un-authentic contents.



**Fig. 4:** The Co-occurrence terms in a tweet and the network of tweets shared

There are many words which are related and they are co-occurring throughout the tweets collected. Fig. 4 shows such a network with a sparsity of 99 percent. We got around 19 words. All are closely related with virus corona and its impact like death, spread, outbreak, cases, etc. Most of them will generate the fear in the social media user and the patient. Even after the COVID-19 is taken the flattened curve in Wuhan, China, the Wuhan and China remains the most co-occurring even after the infection rate declined there and is prominent in other parts of the world.



### 3 Discussion

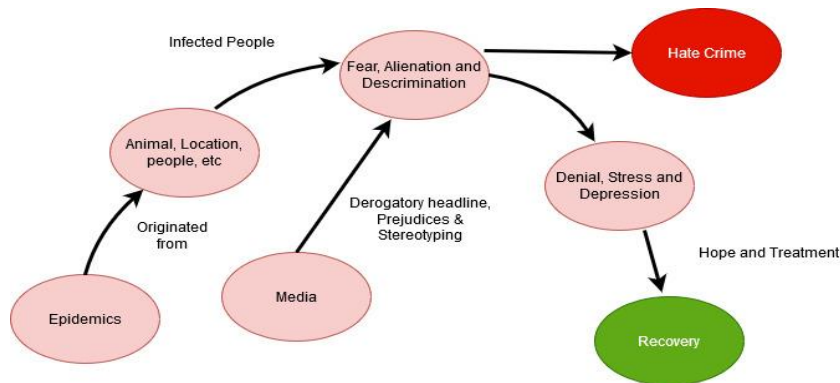
The COVID-19 also resulted in many conspiracies in the cyber world as well as in the physical world. It had resulted in many heated arguments among different world leaders and there were accusations on the spread of the disease and vaccination. But the disease had created a clear damage in the economy of almost all the countries in the world. Most of the countries declared lock-down resulting in many traumas among the citizens of the country. Though the virus is not fatal like MERS and SARS it spread all over the world by killing more than one million people and infecting more than 30 million people across the globe. Along with the disease, the social media spread the rumors and fear mongering messages. Already the people were restricted in their home due to the social distancing. The stress and anxiety in such people is enormous. The people quarantined in hospitals and other relief centres went through a trauma which made many of them to evade from the isolation. The people working away from home are already afraid of the health condition of their in-laws and friends. The physical meeting of the relatives made it impossible for them. The rumours spread among the labourers stranded in different locations were forced to return to their home. That had created havoc in the city like Delhi in India. People gathered in huge numbers that feared to be another disaster if they contracted the disease. The conspiracy theory is veiled in the time of distress across the world. This has created another ruckus in social media. The media is flooded with lots of fake messages and misinformation to misguide the public and align with some ideologies based on their inclination towards it. Normally the misinformation in social media focuses on race, ethnicity, gender, religion, etc. which are more sensitive in the era of Internet technologies. The COVID-19 is also proved that religious sentiments can set aside when fear of death is inside the minds of people. There was no protest when the government took strict action against the religious gathering. The religious leaders become helpless during this situation. Even different religious leaders came down in the social media and other mass media to refrain from all types of gatherings by the believers.

Any distress happening across the globe will be assessed based on their country of origin, religion, ethnicity, race, etc. Based on that the agenda is set on social media and they will create fake information, misinformation and disinformation. An information to become viral, it should embed with hate and fear or any rumor. This will have an impression on the reader and they will start following such information spreading groups or people. The fear induced in people will be used for promoting some products by the company, attract people towards particular sections of people and sometimes direct them towards hate crimes. The fear mongering fake news is repeatedly spread during all the distress of similar nature. The fake news regarding population control and the vaccine sales agenda has been used during the vaccination campaign, Nipah outbreak and the corona pandemic. Such messages or tweets in social media will create a huge adverse impact on the people already affected. The mainstream media also play a major role in spreading the fake news. They were not verifying the authenticity of the news when it gets viral in the social media. Sinophobia erupted in many European countries during this period. Italy has announced a

'hug Chinese campaign' to curb the corona induced racism. The effects of fear, alienation and discrimination due to the COVID-19 infection are escalated with the restriction of movements, loss of jobs and stereotyping. That led many people to denial, stress and depression. Though the disease can be cured with medicine or other containment methods, the anxiety and fear will last long. They need to get psychological intervention. The healthcare workers, community volunteers, Police officials, relief workers and doctors may also fall into stress and anxiety due to the alienation from their family and relatives. A hope in the minds of the affected people and the people with depression or anxiety will have positive impact. Some messages will have healing impact on the people:

*"They are not the hiding patients  
They are staying solitude for you"*

The message is a hope for both the patient and the listener. There are many initiatives by Police and the volunteers to promote the "stay at home", "Break the chain" and "Social Distancing" campaign through social media. Social media was the only medium to communicate with people directly during the lockdown period. Government has taken strict action to keep the people coming out of the home without any reason. Fig. 5 shows a series of the events after occurring a distress and the response in people, government and the media.



**Fig. 5:** The occurrence of a distress and the origin of the social media panic and its influences in human being

## 4 Conclusion

The fear arising from the social media and other mass media can be alleviated using the same media by broadcasting the positive views. That will give hope to the people already affected and others fearing the disease. Following are the findings from the literature review and the practices followed by government and other responsible organizations like WHO. Many governments had enacted the criminal law against spreading the fake news through social media and the government gave a directive to the social media platform to curb the fake news and misinformation. The strict enact-

ment of law can curb the fake news in social media to some extent. It is visible from the analysis of the Twitter data. The study is limited to Twitter data and did not consider other major social media platforms like Facebook and WhatsApp. Similarly, only English texts are used for analysis. The country like India has 22 official languages and other local languages which are used for communication.

## 5 Suggestions

The fake news and the misinformation in the social media will create fear among the audience especially when it is about the health news. The analysis of COVID-19 Twitter data shows that the sharing of positive news in social media will generate hope in the people with anxiety and stress due to fear. Some of the steps that are followed in the social media that are given hope among the patients and the in-laws are listed below:

- The people coming out after the quarantine were greeted with applause by the healthcare workers and other government authorities. That had created a positive vibe in the public as well as the person put under quarantine for many days.
- Positive news on the epidemics like the recovery rate will reduce the fear among the people affected as well as the in-laws of the affected people. The anxiety and the stress among the patient, doctors, and their in-laws will be reduced in considerable rate.
- Symbolic gestures like the tapping of the utensil and clapping hands as gestures of appreciation of the healthcare workers, doctors, police personnel and volunteers will raise their prestige. That can create a positive energy among them and also in the patients. People in India and Italy showed such an appreciation.
- The “Myth Buster” link on the WHO website is a positive step in handling the misinformation and fake news. This will provide more accurate information and can alleviate the doubts in the minds of people
- Incorporating the appropriate algorithm to filter misinformation by the social media platforms
- Government and other organizations involved should continuously be updated about the infected, cured and the death counts through the social media and the government controlled platforms.
- The recovery from the disease by the patients in the volatile age group was a positive sign. The in-laws living away from the old parents may get more relief from the stress by watching or reading such news from the social media or mass media.
- Creative activities and sharing such arts in the social media platforms will boost the mental health of the people and that will be a kind of psychological intervention to the people living in lock-down condition.
- The platforms like WhatsApp, Telegram are more concentrated on puzzle solving in groups. In addition to that they are also used as crowd sourcing of the relief material and sharing the Do's and Don'ts during the lockdown period.

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