

# Health Pandemic and Social Media: A Content Analysis of COVID-Related Posts on a Telegram Channel With More Than One Million Subscribers

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**Abstract.** Background: Mobile-based social media play an important role in the dissemination of information during public health emergencies. Objectives: This study aimed to analyze the contents and trends of public messages posted on Telegram during Coronavirus Disease 2019 (COVID-19) pandemic. Methods: A content analysis of the 1781 messages, posted in a public Telegram channel with more than one million subscribers performed over 9-weeks. The messages were categorized into seven categories. Results: In total, 39% (n=703) of all messages were related to COVID-19. With the official confirmation of the case of COVID-19 in Iran, the number of COVID-related messages started to rise. Overall, the most frequent messages were of joke and humor (n=292, 41.5%), followed by educational messages (n=140, 19.9%). Conclusion: Our study showed that the most popular messages during first weeks of COVID pandemic were satirical, indicating that people may not had taken the risks of this pandemic seriously. It is crucial for health organizations to develop strategies for dissemination of reliable health information through social media.

**Keywords.** COVID-19, Coronavirus, Social media, Social networking, Mobile health.

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## 1. Introduction

Evidence suggests that dissemination of the health information is a key to manage and control a pandemic like COVID-19 [1]. In particular, in emerging infectious disease outbreaks where people are driven to seek information from various channels due to the limited information available about the disease, source of infection, and consequences of the disease, the health-related content of social media can be critical [2-8].

Social media can also serve as a space for community to actively participate in the rapid sharing of information. They can lead to increasing awareness and reducing the risk of spreading the disease [1]. Some benefits of social media are increasing in people interaction, availability of information, accessibility of health information, exchanging social and emotional support, facilitating surveillance for public health, and informing future policy and planning [9]. However social media can provide an environment for the spread of information and correction of false information, they can also broadcast misinformation in health or other subjects [10-13].

Iran with a 23 million year-on-year hike has great growth in the number of mobile social media users [14]. Telegram is one of the most popular instant messaging mobile applications in Iran [15] with an estimated 45-50 million users [14, 16]. This messenger that was launched in 2013 [17], is an instant messaging service in which users can send and receive any type of files and multimedia, along with text messages. A Telegram channel is used for broadcasting various information and messages [18].

To date, there is little published research systematically analyzed the content and trends of health information in social media during health emergencies in Iran. The objectives of this study were to analyze the contents of the COVID-19 related messages posted on a popular Iranian Telegram channel during the first 9-weeks of COVID-19 pandemic and to determine their content, trend and changes over the time. This study is the first to provide insight into the coverage of health information on a messaging mobile app with over 45 million users in Iran.

## 2. Methods

We performed a retrospective content analysis of available public posts shared on Telegram. Content analysis is a methodology for quantitative analysis of social media messages and characterizing them in themes and subthemes. Content analysis has been frequently used in the analysis of websites and social media content [19-21].

We used Telegram analytics website [22] to identify the most popular public Telegram channels among Iranians. From the top five channels, we chose “Giz-Miz” channel based on Telegram analytics and experts’ opinion. The selection criteria were having more than 1,000,000 subscribers, publishing content for the general public and not having specific or professional contents. Giz-Miz with over 1.2 million subscribers is a Telegram channel for the general public that publishes posts about various social topics, including COVID-19. The language of the channel is Persian.

### 2.1. Data collection and coding

We retrieved all the posts on the selected Telegram channel through Telegram application programming interface (API), during a 9-week period from 23 January to 25

March 2020. After excluding the posts not related to Coronavirus or COVID-19, we extracted the images, videos, and texts, posting date, and the number of views for posts.

Two researchers read and analyzed the contents of a sample of 50 randomly selected posts independently and divided them into various categories and subcategories. Afterwards, the authors discussed all identified categories and agreed on the categories and subcategories. Seven categories identified. Then they independently coded all the remaining posts based on latent and manifest contents. In case of any disagreement, a third researcher was consulted. The coefficient of agreement (Cohen kappa) between two researchers was 0.82. Table 1 outlines the coding criteria and categories of the posts.

**Table 1.** Coding criteria and categories of the posts

Categories	Subcategories	Definition	Example
<b>News</b>	Reported Cases and Deaths	-	-Number of positive cases -Number of dead patients
<b>Education</b>	Prevention methods	Posts that teach people about disease prevention	- How to use a mask - How to wash hands
	Food and nutrition	Posts about recommended nutrition to strengthen the immune system during Coronavirus	- Healthy diet
	Corona Characteristics	Posts related to the characteristics of Coronavirus	-Survival of Coronavirus in the environment at different temperature
	Symptoms	Posts which teach different symptoms of COVID-19	-Fever, tiredness, dry cough
	Modes of transmission	Posts which discuss how Coronavirus could transmit among people	-Contact transmission
<b>COVID-19 impact on society</b>	Economic	Posts about how Coronavirus has affected people's incomes and the economies of countries	-The price of oil - Market crash
	Social	Posts about how Corona has influenced people's relationships and social life	-Closing schools, sports competitions and religious - Distribution free masks by people
<b>Health care system</b>	Diagnosis and treatment measures	Posts about measures have been taken to diagnose and treat COVID-19.	-Detection Kit -Treatment protocols
	Health care workers	Posts about Problems and challenges health care workers face.	-Lack of Personal protective equipment
<b>Joke &amp; humor</b>	Social	Posts about something funny about Coronavirus which was said or done by people in the society	-Traditional Iranian Medicine
	Political	Posts about Something funny about Coronavirus which was said or done by government politicians.	-Elections during the spread of Corona
<b>Combating coronavirus</b>	Travel	Posts that discuss actions to prevent people from travelling	-Traffic restrictions
	Cleaning and Disinfecting Public Spaces	Posts about actions have been taken to disinfect cities.	-Disinfection of buses, gas stations and banks
	Providing Online Services	Posts about online services aimed at reducing people's presence in crowded places	-E-Banking, online shopping and E-learning
	Social distancing	Posts about actions have been taken in the community to maintain social distance	-Keep distance from other people -Work from home
<b>Criticism</b>	Social	Posts that criticized people's behavior in society	-Mask holders
	Political	Posts that criticized the government's performance on Coronavirus's actions	- No quarantine of cities - Iran's Mahan Air continue Flights to China

## 2.2. Quantitative data analysis of the posts

We performed descriptive statistics with Microsoft Excel 2019 and SPSS version 26. We calculated frequency and percentage to describe the characteristics of the posts including the post format, topics covered and the number of views. We presented weekly trends of the posts based on the identified categories. The weeks are numbered according to the timeline of the COVID-19 outbreak so that the week that the first case of disease was officially confirmed in Iran was labelled as week 0. Three weeks before that was labelled as week-3 to -1. The five weeks after the announcement of the first case were labelled as week 1 to 5. It's noticeable that the number of disease cases had a considerable increase over time and reached to 9656 cases in week 5.

## 3. Results

A total of 1781 posts were retrieved, reviewed, and analyzed. From these, 39% (n=703) were related to COVID-19 or coronavirus. Other posts were fun and humor, political and social, etc. The average number of views of posts was 526,970 (140,000~ 2,000,000). Coronavirus related posts were three types included of videos (n=293, 41.7%), photos (n=291, 41.4%) and text messages (n=119, 16.9%).

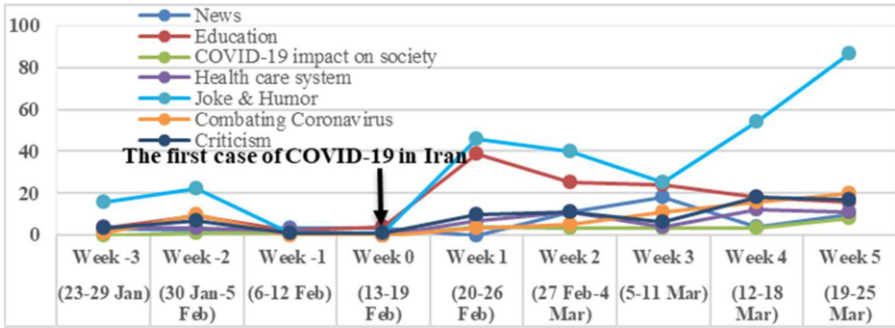
### 3.1. Content of the posts

Table 2 indicates the number of posts by categories on the channel. Most frequent post category was joke and humor with 41.5% (n=292); the number of social joke posts was seven times as many as the number of political joke posts. Education with 140, had the second highest number of posts. In this category, the prevention methods had more posts (63.5%) than other subcategories. Ranked in the third place was criticism, in which the percentage of social criticism was two times more than political criticism with 63.5% and 36.5%, respectively. Coronavirus's impact on society had the lowest number of posts with just 3.3%.

**Table 2.** The number of the posts by categories and subcategories

Categories	Subcategories	N (%)
News	Reported Cases and Deaths	54 (7.7)
Education	Prevention methods	89 (12.7)
	Food and nutrition	11 (1.6)
	Corona Characteristics	18 (2.6)
	Symptoms	9 (1.3)
	Modes of transmission	13 (1.8)
COVID-19 impact on society	Economic	11 (1.6)
	Social	12 (1.7)
Health care system	Diagnosis and treatment measures	26 (3.7)
	Health care workers	28 (4)
Joke & humor	Social	256 (36.4)
	Political	36 (5.1)
Combating COVID-19	Travel	24 (3.4)
	Cleaning and Disinfecting Public Spaces	6 (0.9)
	Providing Online Services	5 (0.7)
	Social distancing	31 (4.4)
Criticism	Social	47 (6.7)
	Political	27 (3.8)
<b>Total</b>		<b>703(100)</b>

### 3.2. The trend of the Posts



**Figure 1.** The trend of the messages by category during the first 9 weeks of COVID-19 pandemic

Figure 1 shows the trend of COVID-19 posts over time. All categories declined in the week -1 and 0. Afterwards, with an exception to education and joke posts, all posts showed a modest steady increase over time. With regards to education posts, there has been a high increase in week 3 before declining over time. However, jokes and humor post soared and reached to their max at the end of the study.

## 4. Discussion

Based on our findings, there was a rise in the number of humor posts as the number of cases increased. Although this finding is counterintuitive, the literature shows that during past public health crises, humors were spread through social media, too. For example, in the analysis of the content of twitter messages during H1N1 Influenza epidemic, the highest proportion (12.7%) of tweets was of humor type [6]. Also in another study about Ebola, the highest proportion (23%) of the posts, which were published on two image sharing platforms, were jokes [23]. Moreover, research shows that Jokes were the most common posts on twitter during the Zika outbreak [24]. This could be illuminated through different explanations. First, humors including social media jokes could be as a tool for stress reduction with a protective role in mental health [25] pandemic with such large extent as COVID-19 can affect mental health and develop stress-related disorder [26]. This unprecedented situation with social distancing and uncertainty about the disease takes a toll on the mental health of the population. This will be exacerbated when the population have been already affected by preexisting problems. For example, in Iran economic stagnation preceded the pandemic had already caused considerable stress and economic hardship in people [27]. Therefore, viewing humor posts help people better cope with adversity. The second reason that jokes are popular during the crises could be chasing a safe and subtle alternative way of criticizing authorities particularly when there might be consequences for the serious criticism [28, 29]. Based on Sulistyningtyas et al, humors can appear as a discourse and social mechanisms in response to a critical situation like COVID-19 pandemic [1]. Finally, many useful information can be emitted through jokes. People can benefit from learning in a relaxing and fun atmosphere [1]. Moreover, in our study, a significant rise in the number of posts in week 5 can be due to approaching the Iranian New Year. Recommendation by health authorities for adhering to social distancing rules could motivate people to spread more posts on jokes through social media to create a more relaxing and joyful atmosphere.

The second most popular group of posts was education. Up to the time of drafting this manuscript, due to lack of vaccine and effective treatment, the best strategy to deal with COVID-19 has been prevention, which is well presented in the educational posts (63.6% of the educational posts) [30]. Another noticeable point of our findings was that despite the huge social effects of coronavirus pandemic on daily lives and social occasions, they were rather failed to address adequately. It seems that in similar studies, a larger proportion of social media messages contained the social and economic consequences of the disease epidemic. In one study, for example, 39 of 100 messages expressed fear/anxiety in the community and 15 of them mentioned the need for medical or economic assistance. These can reflect the social and economic effects of the disease [5]. In another study, 23% of the messages contained personal experiences of the disease, which can be considered a reflection of the social impact of the disease [6].

Health care system was another category which drew little attention. Having preexistence of human and financial limitations in place, as with any pandemic, over the study period health care system was overloaded with the number of patients. However, this was not addressed through messages which were posted (less than 8%). In a study of coverage Ebola epidemic on YouTube, 18% of posts discussed dangers for health care personnel, 11% was about medical help/resources in Africa and 2% discussed need for health care training; that is 31% totally, and it's a noticeable proportion of the posts [5]. Our findings may be an indication of low awareness of the critical role of the health system in the crises among the social media users.

Regarding the trend of the posts, in general, about 30% of posts (30 out of 103) were relevant to COVID-19 before the official announcement of the first case of COVID-19 in Iran (from 23 January to 18 February 2020). Despite this fact that coronavirus was declared as a public health emergency in the world, the greatest number of posts was joke and humor in the first two weeks. This shows that COVID-19 might not be perceived as a serious health issue in Iran. During this time, all flights from China were still in place, and no practical action was taken to prevent arriving the Coronavirus in Iran [31]. During the third week, the number of all COVID-19 posts reached its lowest level, maybe due to coinciding the Father's Day celebration in Iran which made people concentrate on it.

The number of posts increased and peaked a week after the official announcement of the first case of COVID-19 in Iran. During this week, the number of confirmed cases increased from 2 to 137. This sharp increase could be due to disregarding social distancing directives by the people who wanted to participate in the parliament election at the beginning of the week, despite the announcement of the disease. As a result of this increase in the number of COVID-19 cases, the number of education posts reached its peak because people needed information and became more aware of the disease risks and severity. Studies have shown that because of concerns in emergencies, people demand and search for information [2, 3, 25], and become more interested in gaining information about the disease [32]. However results of a study on Twitter during influenza H1N1 pandemic has shown that the number of H1N1-related Tweets declined while the number of cases of the disease was increasing [33]. This difference could be due to the fact that COVID-19 is a more contagious, widespread and new unknown disease that has caused great concern in the world.

In the first week after the onset of COVID-19 in Iran, joke and humor had the highest number of the posts; it may be because of stress control as mentioned earlier; but during the second and third weeks, along with the increase in the number of patients, the number of joke decreased. This show that the public knew that the situation had become more

critical. In the assessment of Twitter during 2009 H1N1 epidemic, the proportion of Tweets containing jokes declined over time [6]. In addition, the number of educational posts declined in these two weeks. A hypothesis can be because of decreasing perceived severity over time, as had shown in a study on H1N1 pandemic [34]. The posts related to combating Coronavirus was the only category that has been on the rise from the 6th to the 9th week, reflecting that the government has taken measures such as disinfecting cities and traffic bans to prevent further spread of the disease.

In this study, we only retrieved posts related to coronavirus and COVID-19 and did not examine the trustworthiness of the posts. In addition, the messages analyzed were retrieved from one public Telegram channel and our findings may not be generalizable to channels with a specific topic of interest. However, the selected Telegram channel is one of the most popular public Telegram channels in Iran with diverse users of different ages and thus can be regarded as having a relatively high impact on the general public.

#### 4.1. Conclusion

We analyzed the content of social media posts related to COVID-19, which were published on Telegram. Different categories of the posts have emerged from our data. Among them, jokes and educational posts were the most common. Posting a considerable amount of posts related to COVID-19 crisis highlighted the prominent role of social media in public emergencies. This could play a critical role in public education in such emergencies where people need and search for information. Reliable and valid information could help to control the widespread public health crises and their consequences. We also found that even with such an extensive crisis with many casualties, people could be distracted by social issues such as an election or traditional ceremonies. Therefore, appropriate knowledge and education should be made available by health organizations to the public to prevent the spread of the disease during outbreaks.

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