Fact or Fiction? Misinformation and Social Media in the Era of COVID-19: An Infodemiology Study

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Abstract

Background: COVID-19 is an unprecedented and massive threat to our society. Understandably the hysteria surrounding COVID-19 has caused the emergence of significant misinformation.

Objective: This study aims to determine the reliability and extent of misinformation on social media platforms.

Methods: We searched three social media platforms (Twitter, TikTok, and Instagram), with a focus on Twitter for informational posts. We then evaluated the credentials of the posters and determined whether or not they were applicable to the information posted.

Results: Twitter, as opposed to TikTok and Instagram, contained a large amount of informational posts. The vast majority of these posts were done by those without applicable credentials (63%) as compared to those with the proper expertise (37%).

Conclusions: This study showed Twitter had a significant amount of COVID-19 informational posts; however, contained advice and information from questionable sources. Misinformation is a significant problem in the COVID-19 crisis. Misinformation can be dangerous in a crisis and we must continue to use sound judgement based on evidence and science in this crisis. Clinical Trial: Not Applicable

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Fact or Fiction? Misinformation and Social Media in the Era of COVID-19: An Infodemiology Study

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ABSTRACT:
Background: COVID-19 is an unprecedented and massive threat to our society. Understandably the hysteria surrounding COVID-19 has caused the emergence of significant misinformation.
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Keywords: social media; COVID-19; novel coronavirus; infodemiology; misinformation

INTRODUCTION:

COVID-19 is an unprecedented, imminent, and serious threat to our society. While the exact projections are difficult to know, at the time of writing this manuscript almost 2.5 million cases of COVID-19 exist with almost 200,000 deaths[1].

Given the size of this threat, it is understandable that a significant amount of panic and fear have risen, among the public and even amongst physicians. Understandably, social media, traditional media, and the internet has been primarily focused on COVID-19 with over 100,000 tweets daily and the majority of news articles focusing daily on the disease[2].

However, there is a significant amount of misinformation being spread through these news sources. The volume of information and misinformation can be very confusing to members of the public and even healthcare practitioners. Given the amount of fear and panic surrounding this disease, it can be easy to latch onto and believe in misinformation.

Twitter is a social networking platform which allows users to "tweet" out short messages that often have an informational component, and has been embraced by medicine[3,4]. Other social media platforms such as TikTok and Instagram also exist, with Tiktok focusing on short user-created videos and Instagram on photos by users.

This study examined the amount of misinformation existent on Twitter primarily. While other platforms were also reviewed briefly, Twitter was selected as the primary modality as Tiktok and Instagram were not primarily informational. Additionally, both use algorithms that make a fully objective search difficult. Finally, Facebook was not included as there was no ability to search for informational content. As Facebook relies on the posts of "friends", reviews of posts would not be reproducible between different people.

METHODS:

Twitter:

The hashtags "covid-19" and "coronavirus" were searched at various time points, April 9 at 10:03 AM, April 9 at 3:07 PM, April 11 at 4:21 PM, April 12 at 1:39 PM and April 9 at 5:09 PM, April 11 at 4:42 PM, April 12 at 2:05 PM respectively. Each instance of a search we reviewed the first 50 tweets for inclusion.

Tweets were included if they gave informational content regarding COVID-19 and were excluded if they possessed no informational content (for example comedy/personal life updates) or were clear retweeting of other news articles.

Regardless of the actual content validity of the recommendations or information, the authors profiles were examined to determine their credentials. If their personal Twitter accounts were not clear, they were often searched on other platforms to verify their credentials. They were then determined to be "appropriate" or "inappropriate". Appropriate credentials were deemed a medical professional, an official governmental health organization (for example the World Health Organization), or in select circumstances neither of these but of a background relevant to the specific post (for example an immunology professor speaking to COVID-19 immunity). However, they were deemed inappropriate if they spoke of a field with which they had limited experience (for example, a congressional candidate with no medical training, speaking about specific therapeutics).

Each tweet was then separated into categories: clinical presentation, diagnostics, epidemiology, general, infection prevention and control, mental health, pathophysiology, prognosis, public health, risk factors, and treatment. The amount of applicable and non-applicable credentials was quantified on an overall basis and within each of these subgroups.

TikTok and Instagram:

TikTok was searched for the hashtag "covid-19" at two different time points, April 15 at 4:35 PM and April 16 at 10:22 PM. During these two time periods there was minimal change (1 new post) between the top videos and thus a review of 75 total videos was performed on April 16, 2020. We performed a limited search of videos as TikTok was not a platform primarily geared towards informational content. Tiktok videos not in English were not reviewed.

Likewise, Instagram was searched for the hashtag “covid19” at one time point April 16. We used the top section of the application thus there would be less time variation. 109 total posts were reviewed. To limit bias, a brand-new account was created and a second search for another 36 entries were performed on April 16. Again, a limited amount of posts was reviewed as Instagram was not geared towards informational content. Posts not in English were not reviewed.

RESULTS:

Twitter:

A total of 350 tweets were initially reviewed and 124 tweets included based on the inclusion criteria previously described.

Amongst those we found that the majority of tweets were from posters with inapplicable credentials, 78/124 or 63%, while only 46/124 or 37% were from those with applicable credentials (Figure 1).

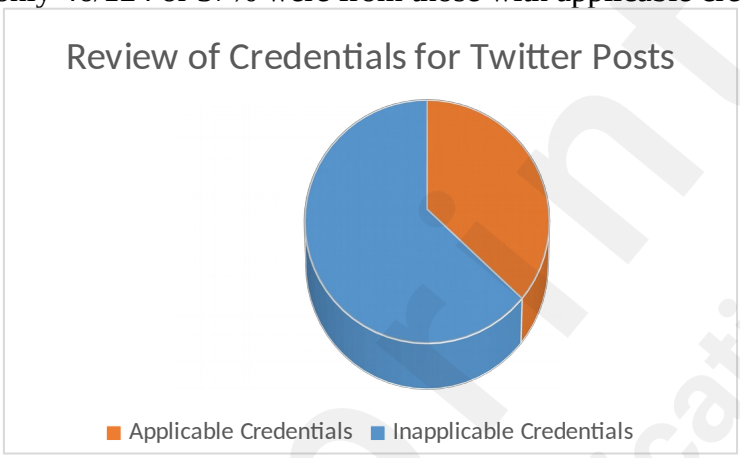

Figure 1. Credentials of Tweet Authors

Furthermore, we separated the tweets into categories and looked at the ratios of applicable to inapplicable credentials amongst various categories (Figure 2). The predominance of inapplicable credentials was found in almost every subcategory with the exception of clinical presentation, prognosis and diagnostics.

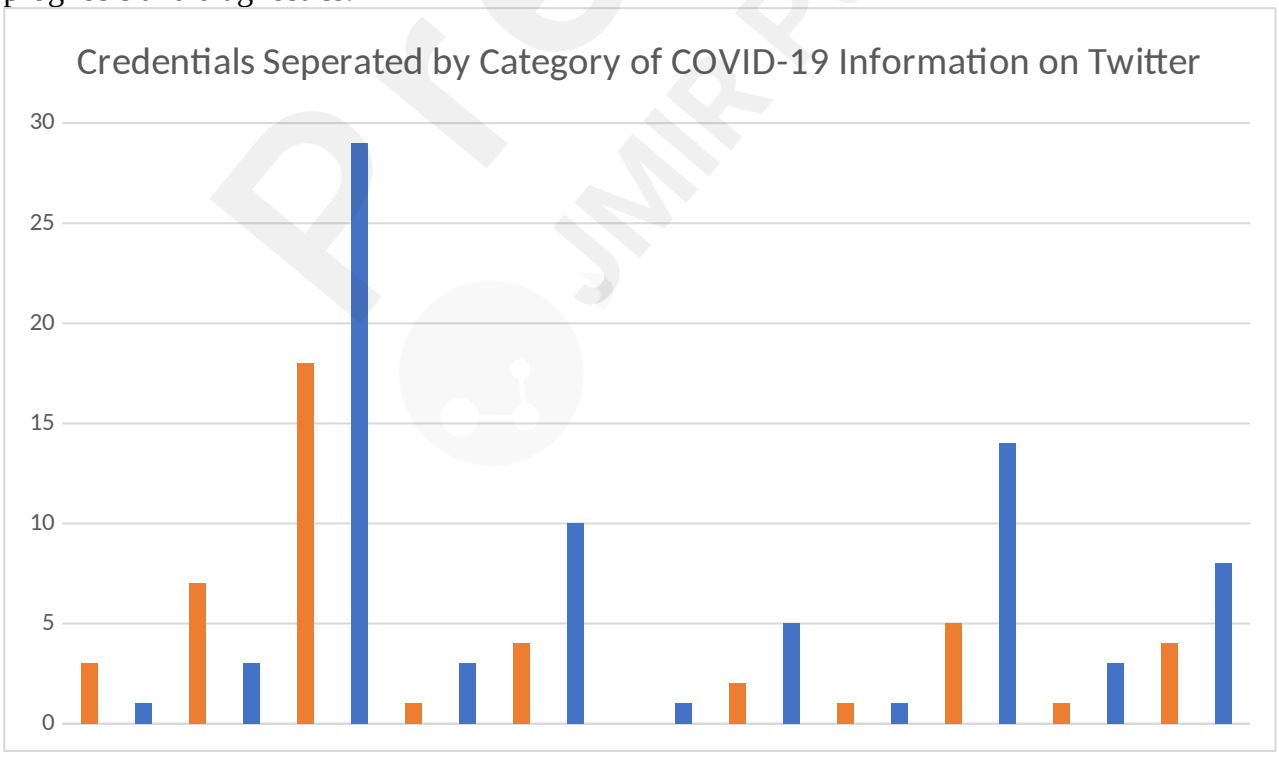

Figure 2. Credentials of the Authors of Tweets Separated by Tweet Category

TikTok and Instagram:

In TikTok, out of the 75 reviewed videos, only 8 posts contained any informational content of which 4 had applicable credentials. On our review of 145 total Instagram posts, there were no informational posts in English.

DISCUSSION:

This study shows preliminary data indicating that a significant amount of information posted on social media may be posts from those without expertise in the fields they are posting in. Additionally, we found that there was a relatively large amount of informational material (35.4%) on Twitter as compared to TikTok (10.7%) and Instagram (0%).

As this was a limited study, the objective of this study was not to make conclusions on the reliability of Twitter. Rather, it is to alert others as to the need to objectively evaluate information, identify misinformation, to stress the importance of peer-review, and to draw conclusions based on sound science.

Even prior to the COVID-19 pandemic, the rise of medical misinformation has been a significant issue. A systematic review was performed by Wang et al. showing an increasing trend of health-related misinformation and the role of social media in a variety of fields, especially related to various infectious diseases and vaccinations[5]. Indeed, various examples of material harm have arisen from misinformation, with sentiments spread on social media causing hostility towards responders during the Ebola crisis and also lowering childhood vaccine rates[6,7].

Misinformation on social media, is in many ways, even more concerning than in traditional media sources due to quick and wide dissemination. For example, researchers studied information diffusion regarding fluoride on Facebook and found many posts were many degrees of separation from the original article. Furthermore, users failed in getting back to the original source of information 12% of the time, which increases the likelihood of misinformation and misrepresentation. Many fluoride posts were unrelated to the original peer-reviewed publication[8].

Another example is a social media circulated article discussing “cough CPR” (a self-treatment for heart attack using coughing), which is not an approved treatment for heart attacks[9]. However, this has been propagated on social media to over 42,000 “likes” and 418,000 “shares”. On social media platforms, it is easy for misinformation to be shared by people attempting to do good initially, but then spread in an almost viral fashion by others without heed to the original evidence for the claim[10]. Often times this echo chamber effect can create a false sense of reliability regardless of the evidence foundation.

Given how prominent COVID-19 is currently on any media platform and it’s high threat level, there is a significant concern as to the amount of misinformation currently being propagated[2,11,12]. The virus is unlike any threat we have faced in modern history and has caused an enormous disruption to our lives. Currently it is still unclear as to the final societal and historical effects of COVID-19. Understandably uncertainty in the face of danger can lead to fear and panic[13,14].

However, when this fear and panic combines with misinformation, it can become dangerous. People can latch onto misinformation especially if it represents hope for a quick solution. For example, a significant amount of hype has gone into the use of hydroxychloroquine despite the evidence being based on very limited trials[15,16]. Although there is possibly some potential with hydroxychloroquine, the journal’s society reflected that there were significant issues with the robustness of the original study[17]. Indeed, infectious disease societies all recommend caution in the use of therapeutics, with the need for further data in robust randomized clinical trials[18,19].

This paper illustrates that misinformation is common in crisis situations and also highlights the importance of properly evaluating evidence. COVID-19 has seen a rise in supposed experts commenting about different aspects of the disease; however, the vast majority of these people do not have the expertise to be making recommendations. During this crisis, misinformation can be very dangerous and we, as healthcare professionals, must continue to use our sound judgement rooted in science and evidence to combat COVID-19. We must make a conscious effort not to give into the fear, panic, and hysteria being propagated by misinformation.

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Supplementary Files

Cover Letter.
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