

RESEARCH ARTICLE

COVID-19 Infodemic: A study on the Fragile Five countries

Merve Boyacı Yıldırım 

Department of Public Relations and Publicity,
Faculty of Economics, Administrative and
Social Sciences, Istanbul Gelisim University,
Istanbul, Turkey

Correspondence

Merve Boyacı Yıldırım, Department of Public
Relations and Publicity, Faculty of Economics,
Administrative and Social Sciences, Istanbul
Gelism University, Istanbul, Turkey.
Email: mboyaci@gelisim.edu.tr

During the COVID-19 pandemic, many rumors and conspiracy theories spread in various media outlets. The purpose of this study is to reveal the nature of the misinformation detected by fact check platforms that spread in the Fragile Five countries. To determine the themes of misinformation about COVID-19 and from which media it is disseminated are a possible way to prevent it. The data of the study were obtained from International Fact-checking Network's CoronaVirusFacts database. One thousand seven hundred thirty-four piece of misinformation collected by web scraping method during the period January 24, 2020 to November 14, 2020 and analyzed with MAXQDA Analytics Pro 2020. As a result of the research, it was found that rumors (96.3%) spread more in the Fragile Five countries than conspiracy theories (3.7%). While the main theme of the rumors is about illness (26.9%) and diagnosis-treatment (25%), conspiracy theories are mostly related to the cause of the disease (68.8%). 53.06% of misinformation was spread through the Facebook platform. 15.32% on Twitter; 13.34% on WhatsApp. Misinformation has been heavily false (85.12%) in both rumor and conspiracy theories. In the second place, misleading (10.09%) news spread.

KEYWORDS

COVID-19, fact-check, infodemic, misinformation, social media

1 | INTRODUCTION

Throughout history, pandemics have had significant impacts on the world population (Yildirim et al., 2021). The COVID-19 pandemic is a health crisis that affects the whole world (Ning et al., 2020). In today's world, in which we experience the age of information, it is impossible to reach the speed and density of communication networks (Akova & Kantar, 2021). In addition to conventional media tools, the fact that social media environments have a large place in our lives with technological developments cause news and information related to the COVID-19 pandemic to spread very quickly in these social networks and cause information pollution. Misinformation can be defined as "any claim of fact that is currently false due to lack of scientific evidence" (Chou et al., 2018). An infodemic can be defined as the rapid spread of information of all kinds, including rumors, gossip, and unreliable information. They are spread instantly and internationally through the growing popular use of mobile phones, social media, the internet, and other communication technologies (WHO, 2018). It

includes attempts to deliberately disseminate misinformation to weaken the public health response and develop alternative agendas of groups or individuals. Misinformation and disinformation can be harmful to people's physical and mental health; increase stigma; threatening valuable health gains; and by leading to inadequate adherence to public health measures, it reduces the effectiveness of these measures and jeopardizes the ability of countries to contain the pandemic (WHO, 2020). The rapid spread of COVID-19 misinformation in both online and offline media causes the fight against infodemic to gain importance.

The rapidly changing situation warrants concerted efforts from governments around the globe (Chen et al., 2020). Public health emergencies can be expressed as fearful and stressful times for people and communities (CDC, 2020; Person et al., 2004). In this uncertain environment, managing rumors, eliminating misinformation and conspiracy theories is essential for containing the pandemic. International health institutions, including the World Health Organization declaring rumors and conspiracy theories as emerging threats to pandemic preparedness

and control and suggested systematically recommended monitoring and control measures to authorities (WHO, 2018, 2020).

Due to all these risks, the spread of misinformation about COVID-19 should be prevented. It is of great importance to put forward the propagation practices of misinformation in order to combat infodemic in online and offline platforms, to take measures for these environments, and to make the public more conscious. Analyzing the misinformation that has been detected by the fact-check platforms can provide insight into this issue. Therefore, the aim of this study is to analyze the misinformation about COVID-19 in the Fragile Five countries.

The Fragile Five countries, namely, Turkey, Brazil, India, Indonesia, and South Africa are similar in terms of macroeconomic indicators such as economic growth, inflation, budget balance, and current balance. However, they also show similarities regarding the spread of false news. According to a survey conducted in 2018 (Newman et al., 2019) among 37 countries, Turkey was the country most exposed to fake news. One out of every two people states that they have come across fake news. According to the same research, Brazil ranks eighth. During a survey conducted in Brazil in May 2020, half of the respondents stated that they were very concerned about fake news and disinformation on the internet and social media (Navarro, 2020). For another research, as the world's largest democracy with the second largest population, the issue of fake news poses a unique threat in India (Keelery, 2020). Although the rates are not that high, there are studies that fake news is common in Indonesia (Khidhir, 2019; Kwanda & Lin, 2020; McDonnell & MacKinnon, 2020) and South Africa (Chenzi, 2021; Wasserman, 2020). For this reason, the Fragile Five countries were selected as the sample for analyzing misinformation with the qualitative method.

In the first part of the study, similar studies in the literature were included, in the research part misinformation about COVID-19 in the Fragile Five countries were analyzed with content analysis and the findings were included, and the findings were interpreted in the conclusion part.

2 | LITERATURE REVIEW

The role of the mass media and social networks has always been fundamental in the management of health-related information. As a matter of fact, during the pandemic period we are in, people sought answers to the questions they were looking for about COVID-19 on these platforms. In Rovetta and Bhagavathula's (2020) research according to keywords such as "novel coronavirus," "China coronavirus," "COVID-19," "2019-nCoV," and "SARS-COV-2" were the top terms trending in Italy in March. Wang et al. (2020) reported that 93.5% of the general public in China used the internet as the primary health care information conduit during the initial stage of the COVID-19 pandemic. Social media platforms are known for the spread of false information and the denial of scientific literature (Rosenberg et al., 2020). This media has become a platform where information about COVID-19 spreads very quickly. Kouzy et al.

(2020) found that medical misinformation and unverifiable content related to the global COVID-19 pandemic were spreading at an alarming rate on social media. In the context of COVID-19, a recent analysis of the most viewed coronavirus YouTube videos found that over 25% of the top videos contained misleading information and totaled 62 million views worldwide (Li et al., 2020).

There is worldwide concern over false news and the possibility that it can influence political, economic, and social well-being. To understand how false news spreads, Vosoughi et al. (2018) used a data set of rumor cascades on Twitter from 2006 to 2017. They found that falsehood also diffused faster than the truth. Facebook, YouTube, and Twitter all said they were working hard to direct users toward reliable sources of medical information and were communicating directly with the World Health Organization and other bodies. When a Facebook user tries to share a conspiracy theory about the coronavirus, it is marked as false once the claim has been reviewed by fact-checkers (Hollowood & Mostrous, 2020). Despite the actions taken by social media companies, examples of fake or misleading news about the coronavirus are easy to find. The WHO has offered a WhatsApp service to refute fake news, but unfortunately the rapid, viral spread of disinformation on social networks has been so widespread that we have, in fact, witnessed the appearance of attitudes harmful to health (Tagliabue et al., 2020).

Rumors and conspiracy theories regarding COVID-19 are hindering the practice of healthy behaviors (such as handwashing and social distancing) and promoting erroneous practices that increase the spread of the virus and ultimately result in poor physical and mental health outcomes (Tasnim et al., 2020). Some examples of harmless suggestions spread on social media, such as holding a hairdryer in the mouth and nose to prevent and neutralize COVID-19, gargling with saltwater in the mouth every 10 min, and keeping onions in the room. Suggestions like taking doses of vitamin C and eating garlic as part of regular meals are welcomed as an antidote to COVID-19 despite the lack of scientific evidence (Mian & Khan, 2020).

Some recommendations were not so harmless and the general public may be tempted to turn to unproductive, unsubstantiated, and somewhat harmful medications for the cure of the virus. Such as in Nigeria, where the health officials found several cases of overdose of chloroquine (a drug used to treat malaria) after news on the purported effectiveness of the drug for treating COVID-19 spread through the news media (Busari & Adebayo, 2020). The Food and Drug Administration referred to one "miracle mineral solution" posted many times on Facebook and Twitter as "the same as drinking bleach." (Rustad & Koenig, 2021). According to this institution, this solution causes severe vomiting, life-threatening low blood pressure, and acute liver failure (Frenkel et al., 2020). Another example, alleged national lockdowns in Europe, the United States, Africa, and other places, triggered panic purchases of people in supermarkets, grocery stores, and other marketing stores. In these places, people overreacted, goods are hoarded and therefore prices for goods and services were raised. This unusual situation has created disruptions in the supply chain and increased demand-supply gaps and food insecurities (Ahinkorah et al., 2020). Misinformation reported by the mass media and then

reconstructed on social networks also focused attention on the possible errors of some hospital structures. In some cases, this will mean that patients will be reluctant to go to hospitals or medical centers for fear of becoming victims of medical errors or at greater risk of transmission (Tagliabue et al., 2020). Widespread misguided misinformation about COVID-19 can spread the disease quickly and cause xenophobia in the continent (Mejova & Kalimeri, 2020; Shimizu, 2020; Thomas, 2020).

At the same time, various conspiracy theories began to take place on such issues as the virus being produced in a laboratory on social media. This theory has taken on many variants from COVID-19 as a bioweapon, spread through 5G technology, or intended to cull populations. It has been debated and discussed in the media and echoed by politicians. The fact that these theories make a tremendous impact on the media affects the public's perspective on these issues. There is also evidence to suggest that exposure to virus misinformation may be more common than often thought. For example, a survey conducted by Ofcom in the United Kingdom reported that almost half (46%) of the British population were exposed to fake news about the coronavirus (Ofcom, 2020). In particular, about two-thirds (66%) of those exposed reported seeing it on a daily basis. As Berinsky (2017) found, even when misinformation is debunked, corrections often increase exposure, increasing recall and belief. Pennycook et al. (2018) have suggested that repeated exposure to a falsehood increased the assumption of accuracy. Unsurprisingly Mitchell and Oliphant (2020) have found that almost a third of Americans now believe in the theory that COVID-19 is an intentional biological weapon. In private Facebook groups with more than 100,000 members and Twitter, conspiracy theories spread that the coronavirus was an invention of the pharmaceutical industry that aimed to sell more expensive drugs and more vaccines to the public (Spencer, 2020). These allegations were so strong that Memon and Carley (2020) discover that many misinformed Twitter users may be anti-vaxxers. Sallam et al. (2020) found that conspiracy beliefs are associated with lower knowledge and higher anxiety levels regarding COVID-19 among students at the University of Jordan. Also, Hossain et al. (2021) found that concern about the potential side effects was one of the core reasons for vaccine-taking hesitancy.

Much of the initial research focused on the species, origins, and spread (Brennen, Simon, Howard, & Nielsen, 2020), as well as the possible effects of misinformation and conspiracies around the coronavirus and pandemic (Freeman et al., 2022). Brennen, Simon, Howard, and Nielsen (2020) found that restructured content prevails, with the majority of misleading or false claims focusing on the actions or policies of public authorities, including government and international organizations such as WHO or the United Nations. Brennen, Simon, and Nielsen (2020) viewed COVID-19 misinformation through a visual lens, focusing explicitly on the visual content in coronavirus misinformation, its function, and its characteristics. Roozenbeek et al. (2020) investigated the susceptibility to COVID-19 misinformation in the United Kingdom, Ireland, Spain, the United States, and Mexico and found although public belief in COVID-19 misinformation is not widespread, a significant proportion of such misinformation in each country surveyed is highly reliable. Rajkumar (2020) and Xiao and Torok (2020)

suggested that amid an infectious disease pandemic, inaccurate or misinformation or exaggerated information may raise health concerns.

Uscinski et al. (2020) explored the prevalence of COVID-19 conspiracy theories and research shows that beliefs in two popular variants of COVID-19 conspiracy theory are the joint product of the psychological predispositions (1) to reject information coming from experts and other authority figures and (2) to view major events as the product of conspiracies, as well as partisan and ideological motivations. Using quantitative content analysis, Islam et al. (2020) followed and examined COVID-19-related rumors, stigma, and conspiracy theories circulating on online platforms, including fact-checking agency websites, Facebook, Twitter, and online newspapers, and their impacts on public health.

3 | MATERIALS AND METHODS

3.1 | Data collection

The data of the study was obtained from the CoronaVirusFacts Database (<https://www.poynter.org/ifcn-covid-19-misinformation/>) of the International Fact-checking Network (IFCN). This database gathers all of the misinformation that has been detected by the CoronaVirusFacts/DatosCoronaVirus alliance. This database unites fact-checkers in more than 70 countries and includes articles published in at least 40 languages.

A method called web scraping has been used to collect news texts. This method is based on the systematic retrieval and processing of news from specified news sources within a certain period by a special algorithm coded for this purpose (Dinov, 2018, p. 524). Web scraping refers to the process of collecting data that is not presented collectively on the internet but is available in a scattered form for later use for various purposes (Atan, 2018, p. 228). In the study, misinformation news in Fragile Five about COVID-19 was collected with Web Scraper (<https://webscraper.io/>) software, and the whole main mass of the news to be analyzed within the scope of the research was obtained. With the web scraping method, the date of misinformation, country of origin of misinformation, fact-check organization, fact-check outcome (true, false, misleading, etc.), the headline of misinformation, the description of the misinformation, and the platforms which spread misinformation (Facebook, Twitter, WhatsApp, etc.) were recorded in a file with csv. extension. With this method, 1866 pieces of misinformation items in the IFCN database were reached between January 24, 2020 and November 14, 2020.

Exclusion criteria include duplicate content and incorrectly assigned misinformation about the country (if the data taken by selecting Fragile Five countries in the database includes different country misinformation). One thousand seven hundred thirty-four misinformation (198 from Turkey; 136 from Indonesia; 619 from India; 741 from Brazil; 40 from South Africa) obtained after applying the exclusion criteria were analyzed with the MAXQDA Analytics Pro 2020 data analysis program. The encodings were made by two coders and consistency of over 80% was achieved.

4 | ANALYSIS METHOD

The study uses a qualitative research method that presents facts and events realistically and holistically and provides a basis for in-depth analysis. The data were obtained by content analysis, which is one of the qualitative methods. The data analyzed by using the MAXQDA Analytics Pro 2020 data analysis program (available at <https://www.maxqda.com/>). Building on other analyses (Brennen, Simon, Howard, & Nielsen, 2020; EuVsDIS, 2020; Hollowood & Mostrous, 2020; Islam et al., 2020; Scott, 2020) a codebook for descriptive analysis was created. Based on the codebook provided in Supporting Information (SI-1), data were reviewed and categorized into two main categories: rumors, and conspiracy theories. Then used the five sub-codes which adapted from Islam et al., including the cause of the disease, illness, diagnosis-treatment, interventions, violence, and others. Also, misinformation was categorized as false, misleading, no evidence, partially false, and so forth. Through the fact-checks, it was determined from which platform the misinformation was spread. The word frequency in misinformation was analyzed using the MAXQDA Analytics Pro, and a code map of the countries was created to reveal the relationship between the codes.

5 | RESULTS AND FINDINGS

One thousand seven hundred thirty-four piece of misinformation identified about COVID-19 in Fragile Five countries during the period January 24, 2020 to November 14, 2020. Given the increase in the volume and diversity of misinformation in circulation, it is possible to say that the number of fact-checks about COVID-19 started to increase in February, reaching a peak in March. There is a decrease in the number of fact-checks from April to June. Although it is seen that the number of misinformation has increased from time to time from June to the present, it can be stated that misinformation numbers did not reach the high value as in term of February–March, when COVID-19 began to spread in many countries in the world (Figure 1).

Of the 1734 fact-checks, 1670 (96.3%) were classified as rumors and 64 (3.7%) as conspiracy theories (Figure 2).

As seen in Figure 3, among all the categories (rumor and conspiracy theory) of misinformation tracked, 26.1% were related to illness, 24.9% were diagnosis–treatment, 20.3% were interventions, 18.2% were miscellaneous, 5.6% were violence, and 4.9% were the cause of the disease.

5.1 | Conspiracy theory

In the COVID-19 outbreak, it is seen that many conspiracy theories are spreading in the Fragile Five countries. There are conspiracy theories on different issues such as that the virus is produced in a laboratory in Wuhan, there is a relationship between the disease and 5G technology, the virus is produced by the US army, the COVID-19 test patents were obtained in 2015 so the disease is a sham, the disease is

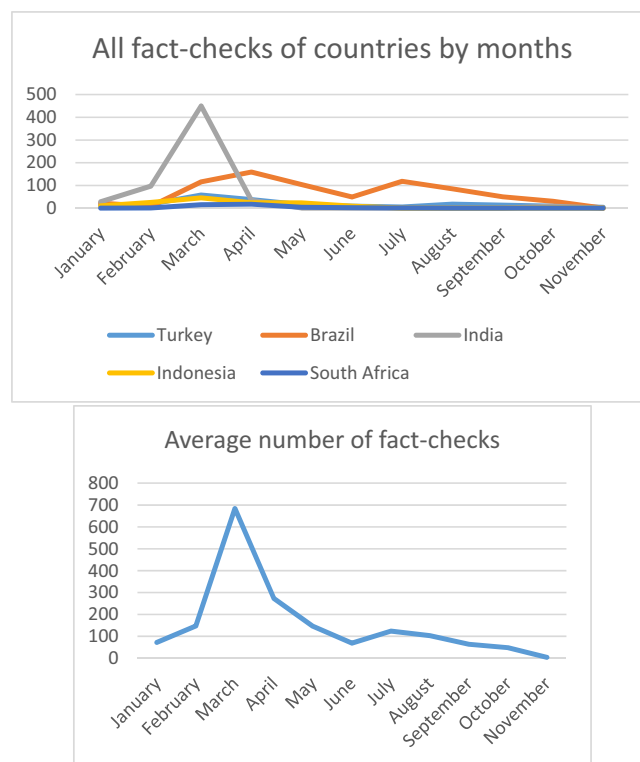


FIGURE 1 Total number of fact-checks by months in the Fragile Five

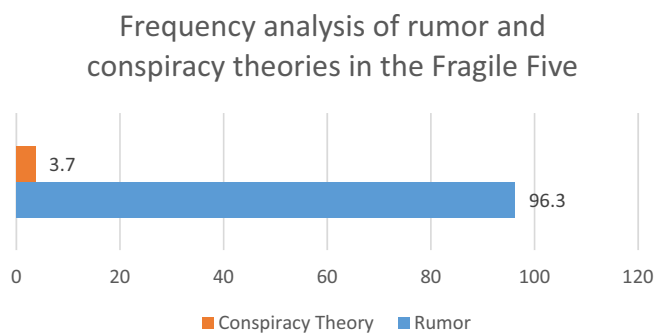


FIGURE 2 Frequency analysis of rumor and conspiracy theories in the Fragile Five

a plan to control the population, and so forth. It is also seen that there are various conspiracy theories regarding vaccines. These are conspiracy theories that a vaccine against this virus had already been invented, COVID-19 vaccines cause genetic damage, alter human RNA and aim for social control, and microchips will be placed in people with vaccines or PCR tests.

In Turkey, 21 pieces of misinformation are identified as a conspiracy theory. Sixteen (76.19%) of the misinformation about the conspiracy theory were classified as the cause of the disease, 2 (9.52%) were in the illness, 2 (9.52%) were in the diagnosis-treatment, and 1 (4.76%) was in the miscellaneous category. All conspiracy theories (21 pieces) were classified as "false" as a result of a fact-check in Turkey.

Conspiracy theories have a 4% rate of all fact-checks in Indonesia. 83.3% of these were related to the cause of the disease and 16.7% to the illness. According to the fact check results classification, 80% of conspiracy theories in Indonesia were false and 20% were misleading.

Ten (1.62%) of the 629 fact-checks in India were conspiracy theories. Eight (80%) of these were related to the cause of the disease and two (20%) were related to diagnosis-treatment. As a result of fact-checks, eight were identified as false, and two were misleading.

In Brazil, 27 (3.6%) out of 741 fact-checks are conspiracy theories. 51.9% of conspiracy theories were related to the cause of the disease, 44.4% to diagnosis-treatment, and 3.7% to the miscellaneous category. Twenty-two (78.6%) of this news were false, four (14.3%) were misleading, and one (3.6%) was partially false.

In South Africa, only 1 out of 40 fact-checks is a conspiracy theory, corresponding to 2.5%. This news was about the cause of the disease. And identified as false to fact-check result.

According to Figure 4 illustrating the average of five countries, 68.8% of conspiracy theories in the Fragile Five countries were related to cause of the disease, 4.7% to illness, 23.4% to diagnosis-treatment, 3.1% to miscellaneous. According to these data, it can be

stated that conspiracy theories in the Fragile Five countries are mostly related to the cause of the disease.

5.2 | Rumors

Of all the infodemic categories analyzed, rumors were the most common. The most common rumors are about signs and symptoms of COVID-19, effects of the disease, its transmission dynamics, use of masks, number of cases and death tolls, diagnosis and treatment of the disease.

In Turkey, 177 (89.4%) of the 198 pieces of misinformation are rumors. Of the rumors 1.12% were related to the cause of the disease, 30.73% to illness, 25.14% to diagnosis-treatment, 23.46% to interventions, 16.76% to miscellaneous, 2.79% to violence. According to the fact check results classification, 163 (91.6%) of rumors in Turkey were false, 12 (6.7%) were partially false and 2 (1.12%) were no evidence.

One hundred thirty-one (95.6%) of 136 misinformation in Indonesia are rumors. The themes of the rumors were analyzed, it was found that 6.87% to cause of the disease, 25.19% to illness, 27.48% to diagnosis-treatment, 9.92% to interventions, 25.95% to miscellaneous, and 6.11% from violence. According to fact-check results 93 (70.99%) of were false, 33 (25.19%) were misleading, 3 (2.29%) were no evidence, 1 (0.76%) was partially false, 1 (0.76%) was mostly false.

In India, 610 (96.82%) of 619 fact-checks are rumors. Thirteen (2.13%) of the rumors were related to cause of the disease, 167 (27.42%) were illness, 135 (22.17%) were diagnosis-treatment, 143 (23.48%) were interventions, 124 (20.36%) were miscellaneous, 46 (7.55%) were violence. It is also found that 503 (82.59%) of rumors were false, 62 (10.18%) were misleading, 40 (6.57%) were mostly false, 3 (0.49%) were partially false, 1 (0.16%) was partially true.

In Brazil, 714 (96.4%) of 741 misinformation are rumors, 19 (2.52%) of rumors were cause of the disease, 202 (26.79%) were illness, 206 (27.32%) were diagnosis-treatment, 156 (20.69%) were interventions, 131 (17.37%) were miscellaneous, 40 (5.31%) were violence. Of the 714 rumors analyzed, 625 (87.54%) were false, 70 (9.80%) were misleading, 3 (0.42%) were no evidence, 1 (0.14%) was mostly false, 15 (2.10%) were partially false.

Themes of All Fact-checks in Fragile Five

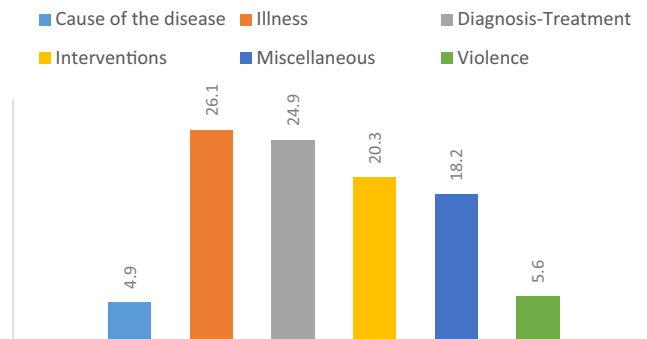


FIGURE 3 Themes of all fact-checks in the Fragile Five

Thematic distribution of conspiracy theories in the Fragile Five

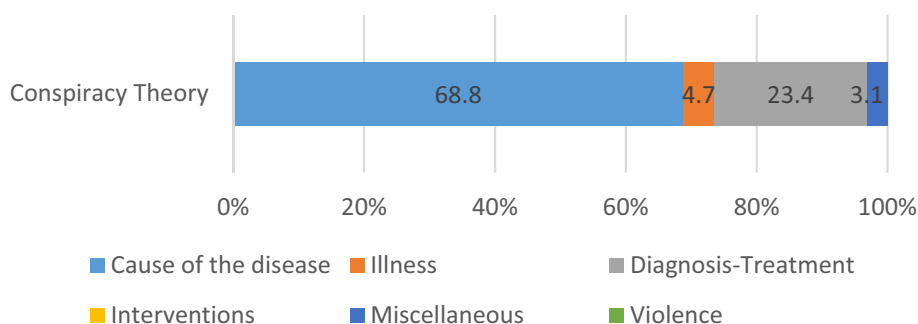
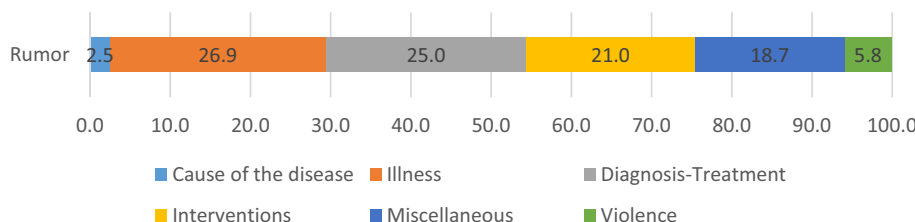
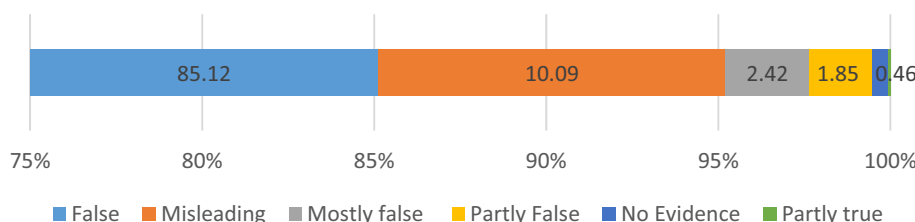


FIGURE 4 Thematic distribution of conspiracy theories in the Fragile Five

Thematic distribution of rumors in the Fragile Five

**FIGURE 5** Thematic distribution of rumors in the Fragile Five

Fact-check results in Fragile Five

**FIGURE 6** Fact-check results in the Fragile Five

Thirty-nine (2.5%) of 40 fact-checks analyzed in Indonesia are rumors. One (2.5%) was related to cause of the disease, 10 (25%) were illness, 11 (27.5%) were diagnosis-treatment, 11 (27.5%) were interventions, 6 (15%) were miscellaneous, 1 (2.5%) was violence. Thirty-six (92.3%) of the misinformation were false and 3 (7.7%) were misleading.

According to Figure 5 illustrating the average of five countries of the rumors, 26.9% were related to illness; 25% were diagnosis, treatment, and cures; 21% were interventions by authorities; 18.7% were various topics; 5.8% were violence and protests; 2.5% were the cause of the disease. It is seen that the main theme of rumors was about statements, claims, and discussion around signs and symptoms of COVID-19, effects of the disease, its transmission dynamics, use of masks, number of cases, and death rates. After that, rumors about diagnosis, treatment, and cures for COVID-19 was spread.

5.3 | Fact check results

Of the 1734 claims for which fact-check results were available, 1476 claims were false (85.12%), 175 were misleading (10.09%), 42 were mostly false (2.42%), 32 were partially false (1.85%), 8 were no evidence (0.46%), and 1 was partially true (0.06%) (Figure 6). According to the research findings, it can be said that the misinformation in the Fragile Five countries is the most false and the second is misleading.

5.4 | Fact-check organizations

The countries with the most fact-checks are Brazil and India. The third is Turkey. Accordingly, fact-check organizations from Brazil were Agência Lupa (17.52%), Estadão Verifica (13.13%), Aos Fatos (7.58%);

Teyit (11.51%) from Turkey; Factly (7.58%), Boom Fact Check (6.71%), FactCrescendo (5.84%), Newschecker.in (4.40%), India Today (4.28%), The Quint (2.72%), Vishvas.News (2.31%), Newsmeter (1.04%), NewsMobile (0.52%), Digiteye India (0.40%) from India; Tempo from Indonesia (6.30%); AFP (3.12%) from France; Africa Check (0.75%) from South Africa; Maldita.es (0.29%), Newtral.es (0.12%), Efecto Cocuyo (0.06%) from Spain; Taiwan Fact Check (0.12%) from Taiwan; PesaCheck (0.12%) from Kenya; Bolivia Verifica (0.06%) from Bolivia; Facta (0.06%) from Italy; Checkeado (0.06%) from Argentina; Raskrinkavanje (0.06%) from Bosnia and Herzegovina (Figure 7).

5.5 | Platforms

Rumors spread mostly on Facebook, followed by WhatsApp and Twitter. In conspiracy theories, misinformation is mainly spread on Facebook, followed by Twitter and WhatsApp. As summarized in Figure 8, in all categories (rumors and conspiracy theory) studied in the Fragile Five countries, 53.06% of misinformation was spread through the Facebook platform. 15.32% on Twitter; 13.34% on WhatsApp; 6.32% on social media; 4.69% on media outlets; 2.87% on YouTube; 1.78% on news outlets; 1.63% on Instagram; 0.20% on local media, TikTok, blogs and Sharechat; 0.15% on radio and Telegram. Based on these data, it can be stated that misinformation spread on mostly Facebook during the COVID-19 outbreak in the Fragile Five countries.

5.6 | Word frequencies

Word frequencies of misinformation in Fragile Five countries was analyzed by MAXQDA Analytics Pro. The most frequently used 30 of 6865 words analyzed are shown in Table 1. As summary shown in

FIGURE 7 Fact-check organizations in the Fragile Five



FIGURE 8 Platforms where misinformation was spread

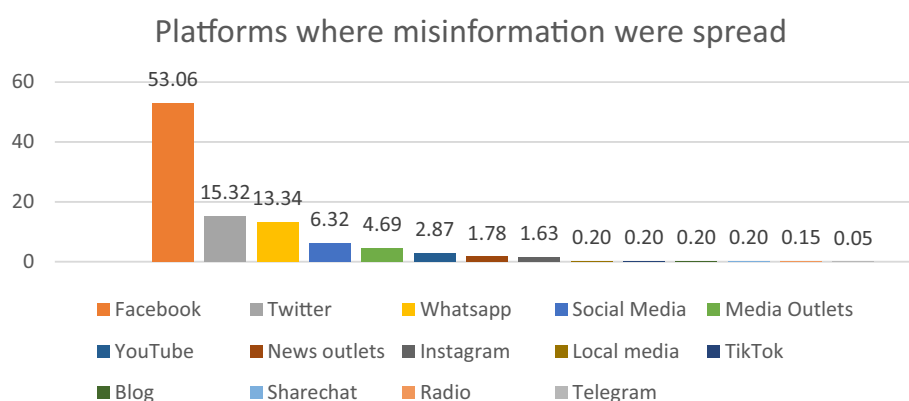


Table 1, according to the findings obtained, the most frequently used words are Facebook (2.57%), Coronavirus (2.50%), COVID-19 (2.37%), video (1.57%), WHO (0.87%), people (0.78%), Twitter (0.76%), WhatsApp (0.71%), media (0.57%), China (0.56%), claim (0.56%), social (0.55%), posts (0.53%), doctor (0.50%), Brazilian (0.48%), health (0.46%), government (0.45%), patients (0.45%), photo (0.44%), pandemic (0.44%), news (0.42%), vaccine (0.41%), virus (0.39%), cure (0.36%), deaths (0.36%), hospital (0.36%), evidence (0.34%), against (0.33%), image (0.33%), and south (0.32). Figure 9 illustrates the word frequencies cloud visually.

5.7 | Code map and code relations browser

Figure 10 illustrates the code map of the misinformation in the Fragile Five countries. In the code map, the selected codes are displayed on a map. The more overlapping the two codes, that is, the more similar they are in terms of their use in the data, the closer they are placed on the map.

The code map is a visualization of the code relations browser. The code relations browser shows the overlapping codes of

misinformation in the Fragile Five countries. The codes with the most intersection are shown in larger letters and the codes with the most relationships are shown with thicker lines.

According to the code relations browser, 20 of 37,890 codes that overlap at least once in the same misinformation can be sorted by frequency as follows: False-Facebook (915), False-Brazil (644), Brazil-Facebook (553), False-India (522), Illness-False (392), Diagnosis/Treatment-False (369), Interventions-False (326), Facebook-India (318), Brazil-AgênciaLupa (304), False-AgênciaLupa (299), Miscellaneous-False (288), Illness-Facebook (285), Diagnosis/Treatment-Facebook (261), Twitter-False (252), WhatsApp-False (234), Brazil-EstadoVerifica (227), Miscellaneous-Facebook (226), Facebook-AgênciaLupa (225), Diagnosis/Treatment-Brazil (215), Interventions-Facebook (202), Illness-Brazil (198). Relevant data are shown in Table 2.

According to the code relations browser, it is seen that the most overlapping codes are Facebook and False. This data indicates that in the Fragile Five countries, the misinformation encoded with the “Facebook” code is also encoded with the “false” code. When the codes containing only themes (cause of the disease, illness, diagnosis-treatment, interventions, violence, and miscellaneous) are activated to

Word	Word length	Frequency	%	Rank	Documents	Documents %
Facebook	8	1188	2.57	1	1122	60.19
Coronavirus	11	1154	2.50	2	795	42.65
Covid-19	8	1093	2.37	3	769	41.26
Video	5	724	1.57	4	418	22.42
WHO	3	400	0.87	5	315	16.90
People	6	358	0.78	6	279	14.97
Twitter	7	349	0.76	7	325	17.44
WhatsApp	8	327	0.71	8	291	15.61
Media	5	265	0.57	9	245	13.14
China	5	259	0.56	10	190	10.19
Claim	5	257	0.56	11	218	11.70
Social	6	252	0.55	12	232	12.45
Posts	5	245	0.53	13	221	11.86
Doctor	6	232	0.50	14	152	8.15
Brazilian	9	220	0.48	15	185	9.92
Health	6	212	0.46	16	170	9.12
Government	10	208	0.45	17	145	7.78
Patients	8	206	0.45	18	154	8.26
Photo	5	204	0.44	19	121	6.49
Pandemic	8	203	0.44	20	175	9.39
News	4	193	0.42	21	162	8.69
Vaccine	7	190	0.41	22	101	5.42
Virus	5	179	0.39	23	142	7.62
Cure	4	168	0.36	24	112	6.01
Deaths	6	166	0.36	25	106	5.69
Hospital	8	164	0.36	26	98	5.26
Evidence	8	158	0.34	27	149	7.99
Against	7	154	0.33	28	131	7.03
Image	5	152	0.33	29	118	6.33
South	5	149	0.32	30	75	4.02

TABLE 1 Word frequencies of misinformation in Fragile Five countries

FIGURE 9 Word cloud of misinformation in Fragile Five countries

Analyzed of 1734 misinformation in Fragile Five countries, it was determined that there was the most misinformation about illness theme (26.1%). There are uncertainties about the disease, which has not yet been fully elucidated, and it is seen that there is misinformation about the signs and symptoms of the disease, the transmission dynamics, whether the masks are really protective, the number of cases, and death rates. On the other hand, there is misinformation regarding both conspiracy theories and rumors in the Fragile Five countries. There are more rumors (96.3%) than conspiracy theories (3.7%).

It has been found that the conspiracy theories spread in the Fragile Five countries are mostly related to the cause of the disease (68.8%). These conspiracy theories consist of different misinformation such as that the disease is produced in a laboratory in Wuhan, the disease is for population control purposes, China produces the disease for economic purposes, and the disease is a biological weapon. In the study of Roozenbeek et al. (2020), they found that the conspiracy theory that the virus was produced in a laboratory in Wuhan spread in the United Kingdom, Ireland, the United States, Spain, and Mexico. Second, there are conspiracy theories with diagnosis-treatment themes (23.4%). Conspiracy theories on this theme seem to be mostly about vaccination. The outcome of such misinformation, examined by the fact-check organizations, were marked mostly as “false.” In conspiracy theories, misinformation is mainly spread on Facebook, followed by Twitter and WhatsApp.

It has been found that most of the misinformation analyzed are rumors. Rumors are more related to the illness theme (26.9%). These rumors due to a wide variety of news such as asymptomatic patients do not transmit COVID-19, the Coronavirus can live on surfaces for 17 days, masks are not beneficial for the disease, the virus cannot live above 36°C, houseflies can spread the virus, the virus can survive in the air for 8 h, the disease is harmless and does not cause death, the virus can be transmitted by imported goods. After that, rumors about diagnosis, treatment, and cures for COVID-19 were spread (25.0%). Islam et al. (2020) found that claims about disease, transmission, and mortality were spread by 24%, and false news about treatment and cure spread by 19%. Similarly, in the study of Evanega et al. (2020) “miracle cures” is the most widely spread misinformation. The outcome of this misinformation, examined by the fact-check organizations, were marked mostly as “false.” Rumors spread mostly on Facebook, followed by WhatsApp and Twitter.

Among the countries studied, Brazil has the highest number of misinformation. Therefore, the fact-check organization most detected the misinformation is Agência Lupa (17.52%) and Estadão Verifica (13.13%) from this country. However, it is also seen that fact-check organizations of many different countries about Fragile Five countries have detected the misinformation. Therefore, it can be stated that this misinformation is not only affecting the Fragile Five but are also on the agenda of other countries. According to the word frequency analysis of false information in the Fragile Five country, it is seen that words such as Facebook, WHO, video, doctor, government, ministry, vaccine, cure, deaths, image, and photo are prominent in the news.

These data can be interpreted as there is misinformation mostly about health-related institutions such as WHO, governments, and ministry for vaccination and treatment.

Words such as Bolsonaro, police, ministry, lockdown, measures are also prominent in the word cloud. In Brazil, one of the Fragile Five countries, it is seen that there is misinformation about Brazilian President Bolsonaro, who has been criticized especially for his approach to COVID-19. At the same time, misinformation such as curfews, government interventions, and public reactions and protests against them are spreading in the Fragile Five countries. According to the code relations browser, it is seen that the most overlapping codes are Facebook and False. When the codes containing only themes analyzed diagnosis-treatment and interventions codes are overlapping. In other words, in the Fragile Five countries, there is misinformation most about the interventions of the governments regarding the diagnosis and treatment of the disease.

It is seen that there is a lot of news about the vaccine in the Fragile Five countries. This misinformation should be taken into consideration by governments, as it may cause prejudice against the vaccine in public. According to the study of Lazarus et al. (2021), respondents who express a higher level of confidence in information from government sources are more likely to accept a vaccine and seek the advice of their employers to do so. Williams et al. (2020) found that the declining intention to vaccinate is related to the perception that the risks of COVID-19 vaccination are exaggerated by the media. For this reason, governments in the Fragile Five countries should focus on studies based on scientific evidence that will gain the public's trust against vaccination and change perceptions based on negative false news in the media.

Although Facebook started efforts to prevent the spread of false information and harmful content about COVID-19 in March (Facebook, 2020; Poynter, 2020), it is seen that the misinformation in the Fragile Five countries is most spread with the Facebook platform. It is followed by Twitter and WhatsApp. Similarly, Twitter and WhatsApp have practices to combat misinformation about COVID-19 and vaccination (Twitter, 2020; WhatsApp, 2020). Unlike other social media platforms, WhatsApp is based on personal use and the content cannot be intervened from outside, making it difficult to control the spread of misinformation about COVID-19. Preventing misinformation sharing on WhatsApp can only be through properly informed people. For this reason, it is seen that WhatsApp has developed strategies to inform people correctly. However, despite this, the number of misinformation spreading through the WhatsApp platform in the Fragile Five countries is too high to underestimate, and that the institution should take different steps to prevent misinformation spread.

As a matter of fact, in this study, which analyzed the spread of misinformation during the COVID-19 outbreak in the Fragile Five countries, it was seen that similar news circulated in these countries. The concept of “global village” put forward by McLuhan (1962) in the 1960 s is today revealed with all its reality. So much so that misinformation circulating in a country does not only remain in circulation in that country but is echoed all over the world with the effect of new communication technologies. Misinformation about COVID-19 was

obtained by users from the internet. Social media poses a risk to public health, and in such crisis situations, governments need to develop strategies to regulate health information on the internet without censorship. The initial basic idea of risk is the possibility of incurring or being harmed by any possible situation (Akdağ et al., 2019). For this reason, both global actors and local administrators should take effective steps regarding the COVID-19 infodemic. The steps taken to prevent the spread of misinformation and reduce information pollution, especially on social media platforms, are important but insufficient. Evidence-based information should be made more accessible to the public, and the spread of misinformation that would allow the public to deviate from scientific facts, especially on treatment methods and vaccines, should be prevented. It is recommended that governments cooperate with technology providers such as Facebook, Twitter, and WhatsApp, which are among the media environments where false information is spread the most. Imposing legal obligations on news sources to cooperate with fact-checking platforms will reduce the spread of false news. At the same time, working to improve the media literacy of the society will reduce the rate of participation in misinformation.

This study has some limitations. First, this study focused only on the Fragile Five countries. Second, this paper analyzed data in a certain date range. And third, the study was not able to reach all the disseminated misinformation. Examined the misinformation detected only by fact-check platforms. For this reason, analyzing other countries with similar characteristics in a larger sample, such as the Fragile Five, is important to reveal misinformation trends in the COVID-19 and to prevent misinformation from spreading to the world. On the other hand, the struggle of fact-check organizations against infodemic in the Fragile Five countries studied is valuable. However, it is recommended that local authorities support these organizations and cooperate in both social and local platforms as an important step to prevent misinformation. Individuals should also feel responsible and avoid spreading false information. Besides, it is recommended to measure the belief and participation degree of individuals living in these countries for this misinformation for further research.

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CONFLICT OF INTEREST

The author declare no competing interests.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

ETHICS STATEMENT

Not applicable.

ORCID

Merve Boyacı Yıldırım  <https://orcid.org/0000-0003-2198-0733>

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AUTHOR BIOGRAPHY

Merve Boyacı Yıldırım is a PhD candidate at Marmara University in Turkey. Currently, she is a Research Assistant at Istanbul Gelişim University Department of Public Relations and Publicity. Her research interests includes public relations, new media, social media, brand communication and can be requested from mboyaci@gelisim.edu.tr.

SUPPORTING INFORMATION

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