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**Dr. Varghese Suresh,**  
MDS, Assistant Professor,  
Department of Public Health  
Dentistry, Educare Institute of  
Dental Sciences, Malappuram,  
Kerala, India

**Dr. Akhil Pallepatti**  
MDS, Assistant Professor,  
Department of Public Health  
Dentistry, Lenora Institute of  
Dental Sciences, Rajahmundry,  
Andhra Pradesh, India

**Dr. Mahesh Jagadeson**  
MDS, Assistant Professor,  
Department of Public Health  
Dentistry, Karpaga Vinayaga  
Institute of Dental Sciences,  
Madhuranthagam, Tamil Nadu,  
India

**Corresponding Author:**  
**Dr. Akhil Pallepatti**  
MDS, Assistant Professor,  
Department of Public Health  
Dentistry, Lenora Institute of  
Dental Sciences, Rajahmundry,  
Andhra Pradesh, India

## COVID-19 myths, misinformation, infodemics and information hygiene: A narrative review

**Dr. Varghese Suresh, Dr. Akhil Pallepatti and Dr. Mahesh Jagadeson**

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### Abstract

**Background:** At the end of 2019, a novel viral disease COVID 19 has devastated the world. From epidemic in China, it has transformed to pandemic worldwide. It is the most severe outbreak in terms of both spread and mortality in recent times. Along with the emergence of SARS-CoV-2 outbreak, there an emergence of thousands of misinformation called Infodemics. The infodemic is spreading faster than the pandemic. Fake news and misinformation were searched from popular news and social media platforms. The spread of misinformation has spread rapidly compared to the disease itself. The myths were easily debunked by asking an expert or searching approved and verified links in the internet. It is the need of the hour to train the new generation of social media users to look for the genuine source of information rather than believing anything they read or hear.

**Keywords:** Infodemics, information hygiene, myths, COVID-19

### Introduction

The novel infectious viral disease COVID 19 was identified in humans in late 2019 in China in a city called Wuhan. This new virus was part of the Corona family of viruses that were previously known to cause illness in both animals and man [1]. They caused illness ranging from common cold to more severe epidemics such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV) [2]. As the world became aware of this new disease, a new problem had raised. There was wide spread of misinformation through all types of media including the internet and social media. This spread of misinformation became such a problem that World Health Organization (WHO) termed it as an INFODEMIC. Infodemics are an excessive amount of information about a problem, which makes it difficult to identify a solution [3]. This creates a serious problem at the time of a health emergency. Infodemics can hinder an effective public health response and cause confusion and distrust in the community. Hashtag search applications were used to find out the most popular myths. They were debunked with the help of information from the WHO, government health agencies around the world and peer-reviewed literature available such as PubMed, MEDLINE, Google Scholar, Cochrane databases etc. This article aims to tackle misinformation over the internet with an aim to reduce the infodemics and also educate regarding the methods to maintain information hygiene.

### Weather and its effects on COVID-19

**“COVID-19 disease cannot be transmitted in areas with hot and humid climates.”**

**“Cold weather and snow kill the new coronavirus.”**

As per the evidence collected so far about SARS-CoV-2, this virus can be transmitted in all kinds of geographic areas regardless of the temperature and humidity. The COVID-19 is mainly transmitted through contact with respiratory droplets. As these droplets land on objects or surfaces. Individuals catch the virus by touching these surfaces and then touching their nose, mouth, or eyes. Reduction in virus load was evident in stable room temperature for up to 2 days. There is no evidence that cold weather can kill the new SARS-CoV-2. Regardless of the external temperature, the normal human body temperature will be around 36.5 °C to 37 °C. Once the virus enters the body it can replicate inside the body.

Moreover, a Chinese study has shown evidence that there is no significant influence of relative humidity, maximum temperature and minimum temperature with cumulative incidence rate or R0 of COVID-19 between different Chinese provinces [4]. So regardless of climate, it is better to adopt protective measures if you live in or travel to an area reporting COVID-19.

#### **Drinking Cow Urine is ultimate COVID-19 prevention measure**

No evidence has been depicted to show that cow urine can cure or prevent COVID-19. There are no clinical trials that have tested the effects of bovine urine in humans. Claims on cow urine as remedy for the disease resulted in increased consumption of cow urine in India and cases of hospitalization have also been reported [5]. Deaths have occurred in children because of cow urine concoction. Animal studies have demonstrated cardio-respiratory problems after drinking cow urine concoction [6]. In the cardiovascular system, initial bradycardia followed by tachycardia and a biphasic effect on blood pressure is observed. The respiratory system symptoms were also reported in few cases.

#### **“Taking a hot bath prevents the new coronavirus disease”**

Taking a hot bath will not prevent individual from catching COVID-19. The normal body temperature remains around 36.5 °C to 37 °C. Even if the person takes a cold or warm shower, the body maintains its optimum temperature. Taking a bath with extremely hot water can be harmful. The virus can survive at higher temperatures also. Using soap while showering might disinfect the skin from the presence of coronavirus if the individual had gone out to an infected zone or have been in contact with someone infected [7].

#### **The COVID 19 disease is transmitted through mosquito bites.**

No evidence was reported suggesting that the new coronavirus could be transmitted by mosquitoes [7]. The SARS-CoV-2 is a respiratory virus. It spreads primarily through droplets generated when an infected person coughs or sneezes [1].

#### **Hand dryers kill SARS-CoV-2.**

Use of Hand dryers is not a method in killing the SARS-CoV-2 [7]. To protect the individual against the virus, frequent cleaning of hands with an alcohol-based hand rub or soap and water regularly can prevent the disease. Drying of hands should be done after cleaning using any drying items like paper towels, tissues, and dryer.

#### **An ultraviolet disinfection lamp kills the new coronavirus.**

UV radiation can cause skin irritation and known to cause skin cancer on frequent exposure [7]. UV light can help in reducing the number and count of SARS-CoV-2 on inanimate surfaces. These lamps cannot be used safely to sterilize hands or other areas of skin. UV radiation is considered as an effective method in healthcare facilities facing shortages of single-use N95 respirators when dealing with COVID-19 crisis. To disinfect, one should aim to achieve a UV dose of at least 1,000 mJ/cm [2, 8].

#### **Thermal scanners can detect COVID 19**

Thermal scanner is a tool to detect people with high body temperatures. However, they are not effective in asymptomatic people where body temperature is normal [7].

This is due to the fact that it takes 2 to 10 days for people who are infected to show the signs of infection and develop a fever [1]. The fever might occur in cycles and use of analgesics might reduce the rise in body temperature. Fever is a not a tell-tail sign of COVID-19 and can be caused by a range of illnesses.

#### **Spraying alcohol or chlorine all over your body kill the new coronavirus**

In many places around the world, attempts are made trying to setup up sanitizer tunnels which spray alcohol or chlorine all over the body while a person walks into a hospital and markets for essential services. It is very important to know this method will not kill viruses that have already entered your body. Moreover, spraying these substances are harmful to mucous membranes, skin and clothes. They may also lead to overexposure of chemicals to the workers who are in close proximity. Awareness is necessary that even though both alcohol and chlorine can be useful to disinfect surfaces they need to be used under suitable recommendations [7].

#### **Vaccines against other infections protect against the new coronavirus**

COVID-19 is a new disease and the development of vaccine takes a long time. Vaccines for other diseases such as pneumonia and Haemophilus influenza type B (Hib) does not provide protection against this virus [2]. There is some speculation regarding BCG (Bacille Calmette-Guérin) as experimental evidence from both animal and human studies have shown that the BCG vaccine produces non-specific effects on the immune system but with no known clinical relevance [9]. In few studies, authors have shown less incidence of disease in countries where the people are vaccinated with BCG [10]. But it should be clear that factors like disease burden, stage of the disease, national demographics and testing rates introduce bias from many confounding variables. But there are clinical trials in progress to check these effects of BCG vaccine [11, 12]. WHO does not recommend BCG vaccination for the prevention of COVID-19 as there is no clear cut evidence [9].

#### **Regularly rinsing your nose with saline help prevent infection with the new coronavirus**

There is no evidence that regular rinsing of the nose with saline will protect people from COVID-19. There is some evidence that regularly rinsing nose with saline can help people recover from the common cold quickly [7].

#### **Eating garlic help prevent infection with the new coronavirus**

Certain plants are good source of phytochemicals and show different biological activities including antiviral activity. However, there is no evidence from human studies which shows that any form of plant-based foods or products can help cure and /or protect people from the new coronavirus [7]. There have been scientific studies based on Molecular docking done on computers in which citrus flavonoids have been shown to possess a good affinity to the receptors such as RBD (Receptor Binding Domain) of spike glycoprotein (RBD-S) and can bind to the ACE2 (Angiotensin Converting Enzyme-2) receptor at the protease domain (PD) (PD-ACE2) of the host cells. Similar finding as a result of testing of Curcumin, brazilin and galangin indicating that these compounds have inhibitory potential for the viral infection and replication. The best result among these was found for

Citrus species and exhibits the greatest potential as an inhibitor to the development of the COVID-19. But suggesting the use of any of these methods for prophylaxis should be done with caution as these are based on scientific simulation [14]. Molecular docking studies are computer simulated and are not controlled clinical trials. Fruits and vegetables are recommended for boosting the immunity [7].

### **The new coronavirus affects older people. Younger ages are safe.**

There is no age predilection for COVID-19. Older individuals and individuals with pre-existing medical conditions (such as immune-compromised, asthma, diabetes, and heart disease) are more vulnerable to this virus. Cases have been reported in all age groups including [15]. It is important for young people to know that they might be asymptomatic and act as carrier of infections to the more vulnerable people of the community. Evidence shows that social distancing is very important in reducing the transmission of infection and all citizens should adhere to the social distancing guidelines.

### **Specific medicines and antibiotics are there to prevent or treat the new coronavirus.**

To date, there is no specific medicine recommended to prevent or treat the new coronavirus. None of them proved to be effective. Only symptomatic treatment and supportive care is provided to the infected people. No antibiotics work against viruses. A hospitalized COVID-19 patient is put on antibiotics for bacterial co-infections.

### **“Hydroxychloroquine is a miracle drug”**

No effective drug therapy for COVID-19 has yet been identified. Given the fact that development of new drugs take up a long time for testing and approval so repurposing of drugs which are already approved for other indications are used as a promising therapeutic modality. Hydroxychloroquine is considered as one such candidate [17]. A nationwide retrospective study based in the USA has reported of the outcomes of COVID-19 patients treated with hydroxychloroquine alone (HC) or with azithromycin (HC+AZ) as treatments in addition to standard supportive management and with no hydroxychloroquine. Outcomes of the study reported that hydroxychloroquine use with or without co-administration of azithromycin did not improve mortality nor reduced mechanical ventilation requirement in hospitalized patients. Contrary to previous studies hydroxychloroquine use alone was associated with an increased mortality risk when compared to standard care alone. Studies conducted in China tested the efficacy and safety of hydroxychloroquine in the treatment of COVID-19 associated pneumonia [17]. Ten hospitals in different parts of China were selected. Results showed that chloroquine phosphate is superior to the controlled treatment on various disease parameters according to the news briefing. Another RCT conducted among 62 patients in Wuhan, China showed that the drug was ineffective and showed a better recovery rate than patients in the control group [18]. The drug is currently advised to use by the US Food and Drug Administration and advocated by the Indian Council for Medical Research but known to have side effects. Reports have come in regarding the use of the drug without consultation of a physician as people have seen this as a miracle cure. Severe side-effects and few deaths were reported in these groups of people.

Another possible drug that is showing the promising effect is Remdesivir. Preliminary results show that patients who received Remdesivir had a 31% time faster recovery as compared to placebo. But it should be noted that such drugs

are only meant for patients as a treatment modality when prescribed by the physicians and this is not an over the counter drug [19, 20].

### **Being able to hold your breath for 10 seconds or more without coughing or feeling discomfort means, you are free from the new coronavirus disease (COVID-19).**

The most common symptoms seen in COVID-19 patients are dry cough, tiredness and fever. Some patients may develop more severe symptoms of the disease, like pneumonia. Holding the breath for 10 seconds or more without feeling discomfort or coughing does not indicate you are free from the coronavirus disease (COVID-19) or any other lung disease. The best way to confirm for COVID-19 disease is with a laboratory test.<sup>7</sup> WHO recommends that Suspected cases should be screened for the SARS-CoV-2 is with nucleic acid amplification tests (NAAT), such as RT-PCR [21].

### **Drinking lots of water every 15 mins flush out the new coronavirus and protect against COVID-19**

There is no scientific evidence that suggests drinking lots of water flushes out the new coronavirus. SARS-CoV-2 usually occupies the respiratory tract not the digestive tract. Furthermore, there is no evidence to support the claim that SARS-CoV-2 will be destroyed by stomach acids. SARS-CoV-2 RNA was detected in stool specimens in the few studies, raising the question about the chance of viral gastrointestinal infection and a faecal-oral transmission route. The SARS-CoV-2 uses angiotensin Q8 converting enzyme (ACE) 2 as a viral receptor for entry process. ACE2 messenger RNA is expressed well and stabilized in the gastrointestinal system by B0AT1. This provides a prerequisite for SARS-CoV-2 infection through the gastrointestinal route [21]. So, drinking water is not going to prevent infection. Modest increases in fluid intake can cause severe water intoxication. This is because the renal excretion of water is limited by antidiuretic hormone (ADH) in sustained quantity [22].

### **Sunlight kills the new coronavirus**

There is no evidence that sunlight kills the new coronavirus. Exposing cloths and other inanimate surfaces and materials to sunlight while drying can be an effective method to kill the virus but this also depends upon the time of exposure as well as climate of the region [7].

### **Frozen foods and ice-cream spread the new coronavirus [7].**

There is no scientific evidence which shows that eating frozen food and ice-cream spreads SARS-CoV2.

### **"#No Meat\_No Corona Virus" campaign in tweeter**

India saw a campaign which flocked many followers with a myth that meat causes COVID -19. Eating hygienically and well-cooked edible meat is safe and does not cause the spread of the new coronavirus. WHO recommends eating fresh and unprocessed foods every day. This includes well-cooked poultry and red meat [7].

### **Drinking Rasam or curry protect from COVID-19**

Rasam is a soup of spices and a common traditional South Indian food. It is prepared using tamarind or tomato juice as a base, with the addition of Indian sesame oil, chili pepper, pepper, turmeric, garlic, coriander, asafoetida, cumin, curry leaves, mustard sea salt, and water. Rasam is considered as a

classic example of traditional functional food with all its ingredients medicinally claimed for various ailments <sup>[23]</sup>. There is no scientific evidence that Rasam or curry protects from the SARS-COV2.

### **If I am young and healthy, I don't need to follow precautionary steps or physical distancing**

Being **young and healthy** might reduce the severity of infection but elderly or immunocompromised might get infected. Social responsibility is a must for preventing the disease. Few cases of death and serious illness were reported even in even young and healthy patients. So, it is important to keep social distancing to break the chain of infection and merely being young and healthy doesn't mean an individual can escape from the disease.

### **COVID-19 is same as influenza**

The speed of transmission is one of the most important points of difference between the two viruses. Influenza has a shorter median incubation period than COVID-19 virus. The estimated serial interval for COVID-19 is about 5-6 days. Influenza virus has a serial interval of 3 days. So, influenza can spread faster than COVID-19. But there have been cases that asymptomatic people have transmitted the disease 24-48 hours before symptom onset. The number of secondary infections generated from one infected individual is to be between 2 and 2.5 for COVID-19 virus, higher than for influenza. They exhibit similar symptoms but, the fraction with severe disease appears to be different. As for COVID-19, 15% of people affected have severe infection requiring oxygen and 5% are critical infections, requiring ventilation. These fractions of severe and critical infections would be higher than what is observed for influenza infection. The COVID-19 shows risk for severe infection in older age and underlying systematic disease conditions. The mortality rate for COVID-19 appears higher than for influenza, especially seasonal influenza. The crude mortality is between 3-4% for COVID-19 which is much higher when compared to seasonal influenza which is having crude mortality of 0.1%.

### **Inhaling steam can kill the virus**

There is absolutely no reason or scientific proof to believe this myth. It cannot prevent nor is considered as a treatment for COVID -19. If not careful with the use of steam inhalation, it can cause a bad steam burn.

### **Religious chants can kill the virus. Clapping hands creates vibrations that destroy the new coronavirus**

Clapping hands just creates sound waves. The vibration created by chanting would not even be sensed by something as small as a virus. Animals have sensory organs for detecting sound and vibrations. Virus is about a million times smaller and cannot detect any such vibrations. There is absolutely no reason to believe that this could be true.

Drinking strong alcohol kills the virus in the inhaled air" and "Drinking alcohol protects against COVID-19"

Frequent or excessive consumption of alcohol can increase the risk of health problems. Unfortunately "Drinking strong alcohol kills the virus in the inhaled air" and "Drinking alcohol protects against COVID-19" are two statements that have become popular myths over the internet.<sup>7</sup> As the pandemic took firm hold in Iran, an infodemic has also spread. This was blindly followed by many people and many ended up in the emergency departments of the hospital due to alcohol poisoning <sup>[25]</sup>. The fact is, consuming alcohol will not

destroy the new coronavirus, and alcohol consumption is likely to increase the health risks and viral infection. Alcohol (at a concentration of at least 60% by volume) works as a disinfectant on the skin, but it has no such effect within the system when ingested <sup>[26]</sup>. Alcohol has a deleterious effect on immune system and will not stimulate immunity and virus resistance. Heavy use of alcohol increases the risk of acute respiratory distress syndrome (ARDS), one of the most severe complications of COVID-19. Notably heavy use can weaken the immune system and thus reduces the ability to cope with infectious diseases. Moreover, alcohol is known to cause Euphoria, depression, disorientation, memory loss, stupor, confusion, blurred vision, slurred speech and hearing, and lack of control <sup>[26]</sup>. All these may cause a person to refrain from adhering to norms of social distancing, frequent hand washing, wearing mouth mask.

### **5G mobile networks spread COVID-19**

SARS-CoV2 cannot travel on radio waves or in the form of a mobile network or Wi-Fi. There have been reports of burning of 5G towers because of fear of the new coronavirus. COVID-19 is spreading and continues to spread worldwide irrespective of presence or absence of 5G mobile networks.<sup>27</sup> COVID-19 is spread through respiratory droplets or when a person touches a contaminated surface and then touching their eyes, mouth or nose.

### **COVID 19 disease is a bioweapon made by China.**

All the evidence till now shows that SARS-CoV-2 is not a purposefully built virus or a bioweapon. It may be currently impossible to disprove all the hypothesis created about this topic. Studies have shown that RBD of SARS-CoV-2 is optimized for binding to human ACE2. This is found to be an efficient solution different from those previously predicted. The genetic data irrefutably did not show any previously used virus backbone for the new SARSCoV-2. So, the current plausibility is (i) natural selection in an animal host before zoonotic transfer; and (ii) natural selection in humans following the zoonotic transfer <sup>[28]</sup>.

### **Discussion and Conclusion**

This is a critical moment for humanity it is important scientifically accurate and socially acceptable information. The information that is circulated should be aimed at minimizing unintentional negative impacts on public and nations. Misinformation can lead to widespread stigma and panic. In order to protect ourselves and our community from misinformation, we should maintain information hygiene. Information Hygiene should be referred to as the range of conditions and practices that help to maintain and acquire health information and prevent the spread of health-related misinformation.

1. Personal experience is not scientific evidence. Never think or believe that personal experience is scientific evidence or pass it on as such to others.
2. Always double-check the information or rumours that is heard or seen. Also, remember to check each fact, individually. If it's a mix of accurate and inaccurate advice better not to share.
3. Stop and think before any message is forwarded. If having any doubts, pause, and check it out further.
4. Conform its trustworthiness by seeking trusted sources of information, such as WHO, national health authorities and certified health professionals.
5. Always keep yourself updated about health issues in your

community.

6. Beware of websites and texts that use the same messages and have the same writing and overall style, as these are likely to be viral messages produced for mass distribution that is intended to mislead.
7. Appearances can be deceptive. It is possible to impersonate official accounts and authorities, including WHO and the government orders. It is always better to check known and verified accounts and websites. This would be the best way to find out if anything is a hoax. Mismatched fonts are indicators for fact-checkers to identify the deceptive documents.
8. Fact checks!! Each line individually. In a long lists of advice, it's easy to believe everything in them just because there are some tips (say, about hand washing) is true.
9. Report misinformation. Most social media platforms give an option to help people report about misinformation. If it is a false claim or misinformation, make sure it is reported

### Remember - "Slow down before you share".

Trustworthy sources and reliable guidance is required in public health since people need to know what measure to take to protect themselves and others and help mitigate the impact of a disease. In the context of the COVID-19 pandemic, the infodemic is exacerbated by the global scale of the emergency and propagated by the interconnected way that information is disseminated and consumed through social media platforms and other channels. While the infodemic is a major challenge to outbreak response, it presents an opportunity to identify and adopt new preparedness and response tools. The WHO Information Network for Epidemics (EPI-WIN) held a two-day, global, online consultation on managing the COVID-19 infodemic but is to be known that while facing such a public health emergency, cooperation and participation of the individual and the community holds the key for success.

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