EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES

http://www.ejbps.com

ISSN 2349-8870
Volume: 7
Issue: 3
432-438
Year: 2020

GLOBAL EPIDEMIC OF CORONAVIRUS - COVID: WHAT CAN WE DO TO MINIMIZE RISKS

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Article Received on 21/01/2020 **Article Revised on 11/02/2020** **Article Accepted on 28/02/2020**

ABSTRACT

The 2019 coronavirus outbreak originated in Hubei Province, Wuhan, in China. Despite travel restrictions, the virus spread across all provinces in China and globally. Based on the airborne nature and the rapidity of the dispersion, this coronavirus outbreak has become a severe public health concern in China and other countries. Coronavirus belongs to a large family of viruses that usually affect wild animals. Following gene mutations (natural or artificial) or close exposure to infected animals, some viruses are occasionally transmitted and spread among humans. Coronavirus causes many diseases: from the common cold to severe diseases, such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV). Such diseases are highly infectious at close range, mainly spread via air and person-to-person contact—it has an approximate death rate of 3%. An effective vaccine against the 2019 coronavirus is expected to be available within six months. Being an airborne respiratory viral disease, precautions taken to prevent the spread of SARS-CoV are similar to those used to lessen the common cold and flu transmission, but stringent quarantining could be required. Apart from wearing facemasks, social distancing, and limiting time in public places and transportation, wearing effective facemasks and frequently washing hands with soap in running water is essential to prevent its spread. COVID-19 will be a global pandemic that will significantly affect the economic and social well-being worldwide. This article is intended to provide a general description of the current situation related to the coronavirus outbreak and not to provide medical advice.

KEYWORDS: Epidemic; Immunity; Pandemic; 25(OH)D; SARS; MERS; Vitamin D; Zika.

INTRODUCTION

The current outbreak of coronavirus—named COVID-19 (previously names as coronavirus-19 or Wuhan coronavirus—originated in a Wuhan city laboratory, in China's Hubei Province.[1] Despite major travel restrictions, the virus rapidly spread to other provinces within China and later to neighboring and distantly located countries because of international travel. By definition, it has become an epidemic but will soon be a pandemic.[2] Travelers should be concerned about this outbreak, partly because of the travel-related spread and subsequent local exposure to the virus. Besides, large-scale flight cancellations can affect business, supply chains, holiday schedules, and travel plans.

In December 2019, Chinese health authorities first reported to the World Health Organization (WHO) a cluster of persons with a viral-mediated unusual form of severe pneumonia. Elderly individuals with preexisting chronic disorders, especially those affecting the immune system (deficiencies) and those taking medications such as prednisolone or similar medications or chemotherapy that suppress the immune system, are more vulnerable to developing severe forms of the disease, pneumonia, and death.

It is important that the WHO, Hubei province health department, United States Centers for Disease Control (US–CDC), and China's Center for Disease Control and Prevention (CCDC) work in collaboration to share data openly and provide frequent updates and advice to the other countries for the benefit of the public.[3] Among other means, this should include sharing reliable information and guidance disseminated through social media platforms. This is particularly important because a few independent media outlets have disseminated exaggerated claims, outrageous predictions, and false information related to disease prevention. For example, without any scientific data, one Australian outlet reported that the Wuhan coronavirus epidemic would lead to more than 65 million human deaths.[4]

Characteristics and evolution of coronavirus (COVID-19)

Many coronaviruses have been identified, including those causing common colds and other upper respiratory infections that change their immunogenic characteristics yearly via mutations. Coronaviruses have existed for a long time and are abundant among wild animals, but it is very rare for them to infect humans—the latter need for them to have specific mutations. Based on genetic glycoprotein analyses, the main natural reservoir for coronaviruses is bats (similar to rabies in many countries). However, snakes and other animals can also carry coronaviruses: these animals act as a reservoir for such viruses.

In rare circumstances, certain exotic live wild animals or their flesh are brought to animal markets; theoretically, these could transmit coronaviruses to humans (i.e., become a zoonotic disease) if they have mutated and have acquired the capacity to enter human cells and spread from human to human. The imposed strict travel restrictions within China were an attempt to control the spread of the virus within China. While these were appropriate, they seem to be failing to enforce the same for those traveling to other countries.

In January 2020, the World Health Organization *temporarily* named the new virus the 2019 novel coronavirus (COVID-19).[5] The COVID-19 name was announced in the second week of February 2020, when this article was submitted. COVID-19 has a genome structure similar to a coronavirus and is genetically related to Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS). It belongs to the cluster of beta coronaviruses, including bat SARS-like (SL)-ZC45, bat SL-ZXC21, SARS-CoV, and MERS-CoV.[6]

The gene sequences of COVID-19 reported (see Genbank) confirmed that it is a single-stranded, positive-sense RNA (+ssRNA) (~30 kb) with 5'-cap structure and 3'-poly-A tail, which is the same genome size of CoV (~30 kb)] [6]. The appearance of COVID-19 is illustrated in Figure 1. Coronavirus-related pneumonia produces various inflammatory and oxidative cytokines, including TNFα (available on Virological.org), significantly worsening the outcome.

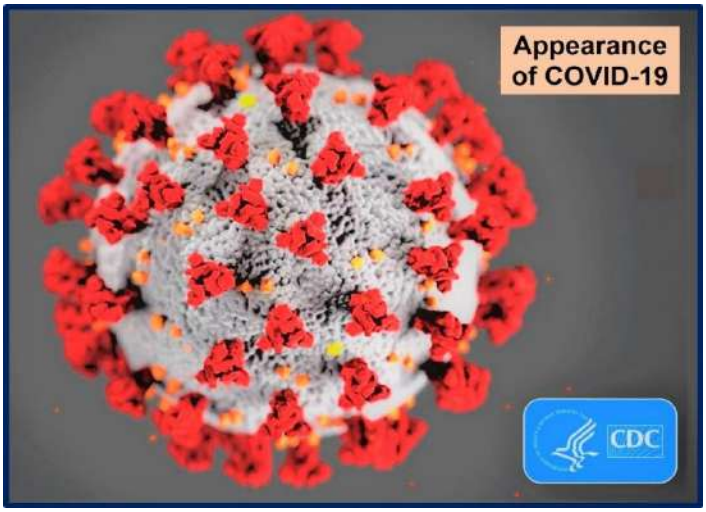

Figure 1: A schematic appearance of COVID virus. From Center for Disease Control and Prevention, USA: https://www.cdc.gov/coronavirus/2019-ncov/index.html

When a specific gene mutation occurs or is introduced within the domains that bind to human cell membranes in the virus genome (i.e., a gain of functions of a virus), viruses could develop the capability to enter human cells, without which it is not possible. This allows viruses to replicate in the host cells and spread to other humans—zoonosis). Viruses in the new host–environment, with time, could mutate again—decreasing or increasing their virulence. Viral recombination and transmission could occur following direct contact with live wild animals.

Nevertheless, such natural coronaviruses in the environment cannot enter human cells without specific mutations on the binding domain, thus failing to infect and create diseases. However, when meaningful mutations occur at the right places, the mutated viruses could change their behavior, enabling them to transfer their genetic material to the host cells, rapidly replicate, and infect other humans.

The similarity and differences between COVID-19 with other common viruses

SARS-CoV belongs to the family of coronaviruses that includes the common cold and MERS.[5] MERS was identified first in Saudi Arabia in 2012, and around 34% of infected people died (i.e., 858 of 2,494 cases). The SARS outbreak in 2002/03 led to 8,098 identified cases and 774 deaths (9.6%): with the implementation of local measures, both epidemics quickly subsided. COVID-19 is less lethal than MERS and SARS.[7] The proposed schematic structure of COVID-19 is illustrated in Figure 2.

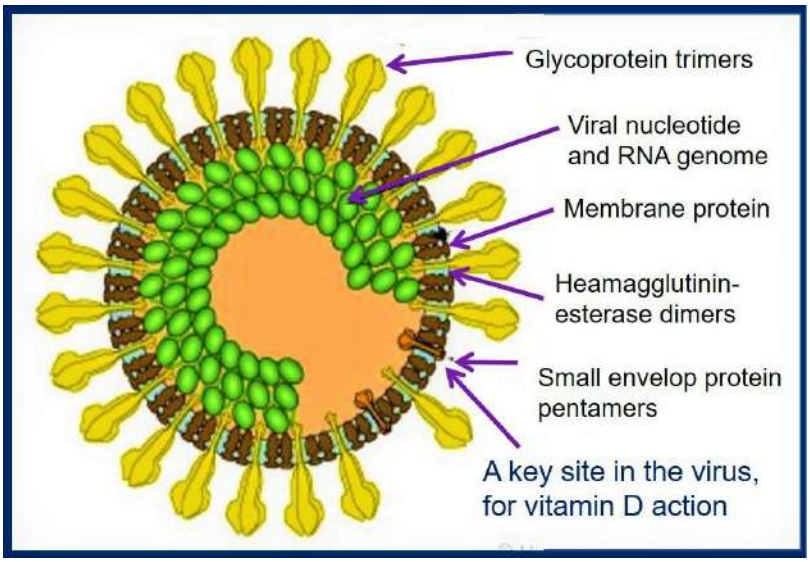

Figure 2: Generic structure of coronaviruses, including COVID19. Adapted from Viral Zone-2020: Swiss Institute of Bioinformatics, C.M.U., 1 rue Michel-Servet, 1211 Geneve 4, Switzerland (https://www.sib.swiss/about-sib/news/10643-sib-experts-and-resources-in-the-fight-against-coronavirus).

The Wuhan coronavirus is moderately infectious and somewhat like SARS. Infectiousness (R_0 value) determines how easily and rapidly a virus is transmitted from person to person. In the absence of proper precautions, based on the contact information, it has been estimated that one person with COVID-19 could infect as many as four people through a single exposure event (i.e., more infectious than common cold/flu viruses). Patients with this disease are now (early Feb 2020) reported in Europe, Japan, Singapore, Taiwan, South Korea, Thailand, Canada, Sri Lanka, and the United States—more than 25 countries so far affected and soon likely to spread globally. For updated information, please see the CDC and WHO websites: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports.

The following are the names of recent respiratory viruses (epidemics), the year of identification, and the reported death rate during the respective viral epidemics: Marburg (first identified in 1967; fatality rate 80%); Ebola (1976; 40%); Hendra (1994; 57%); H5N1-bird flu (1997; 53%); Nipah (1998; 77%); SARS (2002; 9.6%); H1N1 (2009; 17.4%); MERS (2012; 34.4%); H7N9 (bird flu) (2013; 39.3%); COVID-19 (2019; ~3.0%) (data, from the CDC and WHO website).

Incubation periods of COVID-19 and other recent viral outbreaks

Common diseases such as the cold and influenza are infectious to others for 2 to 6 days. Although there may not be obvious signs and symptoms during the incubation period (i.e., prior to appearing signs and symptoms), persons can still spread the virus. Cough-associated droplets carry infectious virus particles that spread within proximity because the droplets are bigger and can infect nearby people. Droplets following a sneeze are much smaller; thus, viruses can -travel with air movement for a considerable distance, as with mycobacterium tuberculosis. Particularly when an infected person walks in crowded open places and travels, such as public transportation and air travel. Because of the potential for a wide spread of infectious particles, isolating undiagnosed people with viruses is challenging. Consequently, when a person is diagnosed or quarantined, they have already spread the disease to others. Therefore, forced group quarantining is imprudent.

A person exposed or already in the incubation period would be better off quarantining in their own home. If this is not possible or unavailable, the local government should offer them a safe, free quarantining facility for the benefit of others. The incubation period (the time from infection exposure to the manifestation of signs and symptoms) of the Wuhan coronavirus is estimated to be between 2 and 14 days. The incubation period depends on the individual's vulnerability (i.e., their immunity and vitamin D status) and the viral load. The suggested 14-day quarantine period for COVID-19 is based on current data to prevent the virus does not spread to others, but not based on science yet. Similar standard measures have been carried with diseases like Ebola and other dangerous viral illnesses.

Symptoms of COVID-19

The symptoms of COVID-19 generally consist of cough, mild fever, and shortness of breath, which can get worse if one has a high viral load or an impaired immune system. However, these symptoms are generic and similar to the common cold and flu: thus, they can be misdiagnosed easily—it is difficult to separate those with COVID-19 by signs and symptoms alone. However, serology can be used to confirm the diagnosis of COVID-19: better and easier tests are expected to be developed. A smaller number of infected people,

especially those with a predominant gastrointestinal entry of the virus, could present with nausea, vomiting, or diarrhea, similar to those associated with enteric viruses.

Most people affected by COVID-19 recover within a few days, having mild symptomatic disease and requiring no treatment or only supportive therapy, and needing no hospitalization. However, a small minority of people (i.e., estimated less than 5%), especially those with comorbidities, immune-compromised status, those taking medications such as prednisolone, and infants and the elderly with severe vitamin D deficiency (hence weakened immune system), could develop complications, such as infective bronchitis or severe pneumonia, causing hypoxia, and perhaps secondary bacterial infections, which make their condition worse.[5] No extra-pulmonary complications are reported at present, but considering the gastrointestinal entry of the virus, this is possible in due course.

Contagiousness of coronavirus

COVID-19 is a respiratory virus that spreads through the air, touch, and personal contact. Thus, exposure to affected people in crowded places, public transportation systems, and air travel are the most common routes of acquiring this disease. Coronaviruses can travel wrapped in droplets produced when an infected person exhales, talk, cough, or sneezes. These particulate droplets are suspended in the air, but heavier droplets travel only a few feet before scattering.

To acquire the Wuhan coronavirus, one needs to be in close contact with someone infected and the vicinity. Without such closer contact, encounters such as visiting a shopping center and in open spaces are unlikely to lead to contracting this disease. In contrast, measles or varicella (chicken pox) spread through smaller droplets over much greater distances and are highly infectious. Thus, compared to many communicable viruses, the infectivity is relatively less with the COVID virus. Coronaviruses can be present in the stools of affected individuals. While their transmission via the fecal–the oral route is possible, it is less likely.

No approved or effective anti-viral medications or vaccines are yet available for COVID. Thus, the current treatment is primarily supportive therapy, keeping affected persons comfortable and enabling natural recovery. The vast majority of people do not require prolonged isolation or hospitalization. In contrast, a minority of people with high viral loads and/or weakened or compromised immune systems might develop complications. Thus, they may need hospitalization, especially if the pulse-oxygen saturation drops below 90.

Protective facemasks against viruses

A respirator mask (disposable particulate respirator) is a personal protective device worn on the face, covering the nose and mouth. Some face masks currently sold online or in stores, unless explicitly designed to filter smaller particles such as viruses (as with N95 masks), are unlikely to prevent inhaling corona or any other virus. Respirator facemask types are rated and certified by the National Institute for Occupational Safety and Health (NIOSH) of the USA, the CDC, and the Occupational Safety and Health Administration (OSHA).

NIOSH-approved disposable respirators are rated: **N** = **N**ot resistant to oil; **R** = **R**esistant to oil; and **P** = strongly resistant (oil **P**roof). As per OSHA, any of these three types of masks can filter virus particles and other particulate matter in the air when breath-in. There are nine types of disposable particulate respirators (for more information, please visit https://www.osha.gov/SLTC/etools/respiratory/index.html). For non-affected people, using a respirator with an exhalation valve is more tolerable and easier to use. Those exposed and infected with respiratory viruses like SARS-CoV should not use masks with exhalation valves to prevent infecting others.

When one is not in close contact with an infected person, the CDC/WHO recommends not wearing face masks. However, considering SARS-CoV is a primarily respiratory virus, this recommendation makes no sense. For personal safety, we recommend that individuals use a mask/respirator with one of the following ratings—N95, KN95, N99, R95, or R99. The rating numbers indicate the percentage of filtering efficiency of particles, including viruses and bacteria. A surgical or cloth mask does not protect the wearer from respiratory viral infections. Although P100 masks are effective, they are unnecessary and uncomfortable to use; they are indicated for those involved in particular high-risk industries, such as handling toxic chemicals, spray paints, etc.

Commonsense measures to prevent infection

During the winter, people are much more likely to get influenza/flu and respiratory syncytial viral diseases than others. Those with immune suppression or lack optimal immune protective activity (e.g., hypovitaminosis D) are more likely to contract viral diseases, including COVID. Healthy people are unlikely to contract the SARS-CoV virus in their day-to-day activities, like visiting a supermarket or a bank without close contact with an infected person. Precautions to be taken to prevent the spread of COVID-19 are similar to those for preventing the contraction of other common respiratory viral diseases.

Following the basic infectious disease prevention principles to mitigate airborne viral diseases generally is sufficient to curtail the spread of COVID. Such principles include (a) avoiding crowded places, (b) employing regular hand washing with soap and water, (c) using medical-grade hand sanitizers (an alcohol-based disinfectant that contains at least 60% alcohol), (d) covering the nose and mouth with disposable tissues or inner elbow when coughing or sneezing to minimize

dispersion of droplets, and (e) using proper facemasks when goes out are reasonable to minimize the risk.

Individual's responsibilities

Additional actions to minimize infections are described on the CDC website.[8] Because coronaviruses can enter the body via mucosal surfaces, one should not touch the eyes, nose, or mouth without thoroughly washing hands for 15 to 20 seconds when returning home. It is an individual's responsibility to stay at home when one has flu-like symptoms or unexplained fever and avoid those with symptoms of respiratory tract infections, like having a runny nose, coughing, and sneezing.

In contrast to COVID, a moderately infectious respiratory viral disease, measles, chicken pox, and bacterial diseases such as tuberculosis through micro-droplets can travel through the air for more than 100 feet and thus could infect many more people than SARS-CoV. Other viruses, such as HIV and hepatitis, are transmitted only through direct contact with the bodily fluids of an infected person. Despite these, coronavirus infections can go unnoticed during the incubation period because of this uncertainty and the lack of clear manifestations of symptomatology, as seen in measles and chicken pox.

Human-to-human transmission of COVID-19

Human-to-human transmission can be curtailed by implementing efficient public health measures, such as well-organized tracking of individuals in contact with an infected person, isolating sick people (quarantine measures), and large-scale public education. Measures such as mandatory temperature checking and health screenings of suspected persons at major airports, especially those arriving from Wuhan and other affected regions in China, are helpful in the early identification and quarantining of people with an illness.

Individual health authorities in many countries have taken effective public health measures to curtail this disease, which had a tangible impact on curtailing the spread of the virus. However, the mixed messages from the WHO and the CDC could muddle others and are likely to reduce compliance by the public. Failure to take adequate precautionary actions is likely deleterious for the populous and the country's economy.

Dissemination of the disease via air travelers

The spread of COVID to countries outside China occurs primarily from air travel of Chinese tourists and workers and visitors returning home from Wuhan and other infected regions in China. In countries such as the United States, individuals arriving from areas where the coronavirus is present are supposed to be quarantined for two weeks to ensure that they are not infectious. However, this does not seem to be happening in practice: little or no screening is done at many country entry points. From such travelers, others can get infected even though they may not have visited the places known to have a widespread disease. Despite proper quarantine being an essential part of public health measures in a viral epidemic, its implementation is unsatisfactory.

The number of people infected with the Wuhan coronavirus in China exponentially increased in January 2020: faster than that occurred with the SARS virus in 2002/03. Nevertheless, the average healthy person should not panic, except avoid visiting any part of China and the few cities outside that have been affected over the past few weeks. However, there is a possibility that travel restrictions are likely to extend to other regions and countries if the disease continues to spread. When new information becomes available, global public health organizations, such as the CDC, WHO, and similar organizations in China, should issue updated guidance and additional steps to prevent disease spread.

Reducing mortality from COVID

The estimated death rate associated with the Wuhan coronavirus is currently approximately 3%: tenfold less than the SARS virus in 2003. However, with changing environments and resultant evolutionary pressures, acquiring viral mutations could modify its virulence. Supportive therapies, providing ICU-based care for highly selected patients experiencing significant respiratory difficulties, pneumonia, or hypoxia, and boosting the immune system using high-dose vitamin D can reduce hospitalizations and deaths.

Many people infected with this coronavirus, having a robust immune system that is not compromised, may never recognize that they have this virus or experience a mild illness, leading to a full recovery. Nevertheless, they could be infectious to others. Considering this, the incidence and actual prevalence of the virus can be markedly higher than reported. Deaths caused by COVID-19 may be under-reporting because the diagnostic test has not been done, and the cause of death entered as other diseases, such as bronchitis or pneumonia, unrelated to coronavirus. Similarly, just because they have a positive test, that does not mean the cause of death is COVID: They may be dying from other co-existing diseases: thus, over-reporting COVID deaths.

How long will it take to develop a vaccine?

Developing an effective vaccine for a respiratory viral or other disease takes several years. To properly observe and document vaccine-associated longer-term adverse effects, they need a minimum of five years of scrutiny to establish their safety. With such a timeline, the current coronavirus outbreak is likely to be over by the time a suitable vaccine is developed. For the SARS outbreak in 2003, it took 20 months to develop a vaccine ready for human clinical trials. However, the vaccine was not needed by then as the disease was well under control.

In contrast, it took only six months to develop a vaccine for the Zika virus, for which an outbreak occurred in 2015. However, it will take a few years to establish their

safety. Recently, the coronavirus genome has been sequenced, and candidate proteins have been identified that can be used to generate a vaccine. The author estimates that researchers will generate an effective vaccine for the current coronavirus in about six months.

Chloroquine is widely used against malaria and autoimmune diseases. It is also known to block the fusion of viruses and interfere with glycosylation and host cell entry, as demonstrated in the case of SARS-CoV cellular receptors.[9] Anti-viral drugs, such as ribavirin, interferon, lopinavir-ritonavir, and corticosteroids, have been studied in patients with SARS or MERS with varying results. The actual efficacy of some drugs remains a matter of controversy.[10] Remdesivir is an anti-viral drug in nucleotide analogs but has significant adverse effects.

A recent *in vitro* study reported that combining chloroquine and remdesivir efficaciously controlled SARS-CoV infection. Preliminary data using animal models suggest broad-spectrum anti-viral, such as an RNA polymerase inhibitor, remdesivir, lopinavir/ritonavir, and interferon-β might be effective against COVID, as previously reported against MERS-CoV. Thus, researchers are experimenting with nucleic acid vaccine platform approaches that have been used for generating vaccines against SARS-CoV and MERS-CoV.

What can be done right now to reduce disease risk and severity?

The modes of precisely diagnosing the current coronavirus at the earliest possible time are essential. With severe infections, isolation of patients and reporting to authorities for contact surveillance, supportive therapies, immune boosting, dynamic guidance, and avoiding unnecessary panic are critical. For individuals, good personal hygiene, fitted masks (N95), ventilation, and avoiding crowded places will help prevent the spread of SARS-CoV infection.

The protective qualities of cloth and surgical masks can be enhanced by surfaces impregnating with ionic zinc or silver oxide (Zno; Zn^{2+}–O^{2-}) nanoparticles[11] with wurtzite structure or perhaps PEGylated ZnO-nano-particles[12] (or oxozinc) likely to have effective antibacterial and anti-viral efficacy.[13,14] Proper incorporation of ZnO- nanoparticles into surface materials can make them stable and able to kill pathogens on contact.[15] Preliminary data suggest that COVID enters pulmonary cells via angiotensin 2 (ACE-2) and blocks the enzyme that degrade angiotensin II.[16] Excess local concentration of angiotensin II causes pulmonary hypertension and edema, acute respiratory distress syndrome, hypoxia, and pneumonia-associated death. This pathway could be interrupted with vitamin D, which blocks renin, thus preventing the over-activation of the renin-angiotensin axis and, thus, the generation of angiotensin-II.

Adequate vitamin D levels have been associated with reduced incidence and severity of enveloped viruses such as herpes zoster, Epstein-Barr, hepatitis, Ebola, HIV, dengue, measles, and mumps.[17,18] Studies have reported that administering an oral dose of above 50,000 IU of vitamin D reduces the risks of having influenza. Vitamin D adequacy also reduces the severity of pneumonia associated with coronavirus infections. Vitamin D is a natural vitamin, so the risk of administering too much is minuscule. Therefore, vitamin D should be used not only as a disease prevention but also as an adjunct agent during the treatment of the disease.

Those deficient in vitamin D and other m micronutrients will be at a greater risk of developing viral diseases, including the current coronaviruses. Thus, the most effective option currently is to take high doses of vitamin D supplements and/or advise people to get exposed to the summer-like sun daily to raise their serum 25(OH)D concentrations above 40 ng/mL, allowing them to boost their immunity, before exposure to the virus. This approach should reduce the risk of coronavirus-related complications and deaths and the common cold, influenza, and associated pneumonia, thus reducing deaths.

Use of high-dose oral vitamin D and antioxidants to reduce the risks and severity of coronavirus infection

Vitamin D improves the immune system. Its deficiency increases vulnerability to viral infections, such as colds.[17,18] Especially during the winter months, unless supplements are taken, serum 25(OH)D concentrations are low in most people. Levels begin to rise only at the beginning of the summer, coinciding with reducing risks from flu. Considering its many biological and physiological aspects, vitamin D's immuno-regulatory and anti-inflammatory effects occur via several mechanisms.[17] The author recommends maintaining vitamin D adequacy in individuals and in the community to help control and reduce the risks and severity of the Wuhan coronavirus. It is advisable to maintain serum 25(OH)D concentrations above 40 ng/mL (100 nmol/L), preferably at a level greater than 50 ng/L (125 nmol/L), together with the sufficiency of other micronutrients, such as zinc, selenium, magnesium, and antioxidants.

Considering the inability to diagnose this coronavirus during its incubation period, people feeling unhealthy, who have a fever, or who have been exposed to an infected person might benefit from taking a loading dose of vitamin D of between 200,000 (four 50,000 IU capsules) to 300,000 international units (IU) as a single oral dose, along with supplementation with the mentioned micronutrients, to boost and strengthen the immune system. This can be repeated after one or two weeks if symptoms persist. Taking a reasonable daily maintenance dose on a longer-term basis is recommended. This would strengthen the immune system so, like the other body systems, within three to four days of administration. This highly cost-effective

therapy, costing no more than $3 per person, is expected to speed up the recovery and reduce the risks of contracting the disease, its complications, and deaths.

In hospitals, in a community, or even in home settings, a single (or divided over a few days) high dose of vitamin D would be greatly beneficial in staying healthy during the current epidemic. From a disease prevention strategy point of view, the most cost-effective approach would be the prophylactic administration of high-dose vitamin D to the entire community at risk before exposure—prior to coronavirus appearing in that locality. Such administration of short-term high doses of vitamin D is safe. In general, to cause adverse effects from orally administered vitamin D, one must take daily doses higher than 25,000 IU for a few years: or, as mistakenly (accidentally) happened, consume one million IU daily for a few days, increasing serum 25(OH)D concentrations above 250 ng/mL. Thus, the above-mentioned dose will not cause adverse effects; potential benefits far outweigh any theoretical risk.

CONCLUSION

The number of people infected with the Wuhan coronavirus (COVID-19) in China and elsewhere exponentially increasing over the past few weeks, faster than with the SARS virus (SARS-CoV). Nevertheless, the current death rate from COVID-19 is much less than that associated with SARS or MERS in the past. Despite these, the current coronavirus infection will likely be a pandemic. It is likely that not only will this epidemic be under control, but also a vaccine will be available within the next four to six months.

The average person who is not directly exposed to an infected person should not panic. Media is giving an exaggerated gloomy picture, but the acute situation will be over soon. However, the socioeconomic consequences and global supply chain difficulties will have a longer-term negative effect. There is no reason to cancel local travel plans except for China and other affected regions outside China. However, travel restrictions are likely to extend to other regions and countries if the disease spreads.

Conflicts of Interest

The author declares no conflicts of interest. He received no funding for this work or assistance in professional writing for this article.

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