



Mystery of Vitamin D in COVID-19 Treatment : Is It True That Taking Vitamin D Can Cure Or Prevent COVID-19?

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Abstract

Since the outbreak of COVID-19, the damage done to the world in every aspect has been increasing in large scale which later became a global crisis. When the pandemic first started, there was little to no information or knowledge about the virus and how to prevent it from spreading. This review discussed the possible mechanism and roles of vitamin D in preventing COVID-19 and its relationship with the virus.

Keywords: Vitamin D, COVID-19, Vitamin D deficiency, Vitamin supplementation, Vitamin insufficiency

Introduction

Since the outbreak of deadly virus known as Coronavirus or COVID-19 came to reality, our world has been facing such a huge loss in terms of population and financial as the virus keeps on taking millions and millions of lives in an alarming rate. We didn't have proper curing methods or any medicine back then. Later, vitamin D was introduced to the medical field as more people started taking medicines along with vitamin D believing that it could be possible to cure COVID-19. Many researches indicated that vitamin D supplementation would be advantageous in the treatment of COVID-19 patients, in reducing the presence of SARS-CoV-2 at the level of the upper respiratory tract, in making the patients less infectious. Daily or weekly intake of vitamin D without additional doses showed protective against acute respiratory tract infection, especially in persons with vitamin D deficiency.

There was enough clinical evidence to prove that vitamin D is effective against COVID-19. However, most people do not know whether taking vitamin D is best for curing or preventing infections and what does it do to our body when we ingest it. These are

the matters which will be discussed later in the following paragraphs.

Epidemiology of COVID-19

Origin of COVID-19

The current CoV infection started in Wuhan, Hubei, China, late in 2019. It's the disease with a class of epidemics with human-to-human transmission caused by severe acute respiratory syndrome coronavirus 2 (Kumar et al., 2021; Li et al., 2021; Rosenthal et al., 2022). The virus was highly infective when first discovered which made The World Health Organization (WHO) declared the disease a global pandemic. The situation awareness began to greatly increase considered the growing number of deaths around the world.

Person-to-person transmission

The primary means of transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It occurs mainly through close-range contact via respiratory particles (coughs, sneezes or talks). If another person inhales or makes contact with the mucous membranes can caused infection to occur.

The other way around is when a person's hands contaminated by these secretions come into contact with person's face, eyes, nose or mouth.

Virology

Corona viruses are enveloped positive-stranded RNA viruses. Coronavirus Study Group of the International Committee on Taxonomy of Viruses has proposed that this virus be designated severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)¹. The closest RNA sequence similarity was found to be two bat coronaviruses which could be indicated that bats are the primary source².

The host receptor for SARS-CoV-2 cell entry is the same as for SARS-CoV, the angiotensin-converting enzyme 2 (ACE2)³. SARS-CoV-2 binds to ACE2 through the receptor-binding domain of its spike protein.

Prevention of Covid-19

After the pandemic spread across the world and became more severe, the awareness of the situation also increased as well. Many organizations began to take strict measures against the spread of infectious diseases more seriously. People began to adjust their lifestyle to fit in with the situation as we called the measurement taken the "New normal lifestyle". The goal of new normal measurement is to protect ourselves and people around us from the dangers of the deadly virus. There are many ways for us to do in order to keep ourselves safe.

1. Getting vaccinated as soon as possible
2. Keep a physical distance of at least 1 meter from others, avoid crowds and close contact.
3. Wear masks when physical distancing is not possible and in poorly ventilated settings.
4. Clean your hands frequently with alcohol-based hand rub or soap and water.
5. Cover your mouth and nose with a bent elbow or tissue when you cough or sneeze.
6. If you develop symptoms or test positive for COVID-19, self isolate until you recover⁴.

There is also a possible way to prevent COVID-19 from entering and destroying your body which scientists believe it might be useful in the future. The method mentioned is "Vitamin D" as vitamin D has many positive benefits to those who are sick or weak.

Vitamin D roles in the body

How vitamin D benefits human body

Vitamin D is a hormone helping in regulation of the immune system as well as playing a pivotal role in responses to microbial infections. It regulates inflammatory processes by influencing the transcription of immune-response genes in macrophages, T cells, and dendritic cells. These roles of vitamin D in our body and how it benefits us indicated that vitamin D might also play a role in infection of SARS-CoV-2⁵.

Vitamin D inhibits cytokine storm by switching the pro-inflammatory Th1 and Th17 to the anti-inflammatory Th2 and Treg response. Vitamin D is therefore expected to play a role in relieving pain and symptoms, preventing infection or treating SARS-CoV-2. Several mechanisms by which vitamin D may reduce the risk of COVID-19 infection are possible as shown in some effects of vitamin D such as inducing the transcription of cathelicidin and defensin⁵. To reduce the risk of common cold, vitamin D uses three pathways: physical barrier, cellular natural immunity and adaptive immunity⁶. Vitamin D supplementation was also found to enhance CD4+ T cell count in HIV infection.

The relationship between vitamin D and COVID-19

Vitamin D and COVID-19 might have connections with each other concerning the treating mechanism and healing ability found in vitamin D. Vitamin D exerted activity in lung tissue and played protective effects on experimental interstitial pneumonitis⁷. Vitamin D insufficiency can be involved in ARDS and heart failure⁸ and these are the manifestations of severely ill COVID-19 subjects.

A correlation between vitamin D deficiency and COVID-19 severity level

The study is based on data from Israel's first two coronavirus waves before vaccines were widely available. The study found that people with a vitamin D deficiency are more likely to develop a severe or critical case of COVID-19 compared to those with adequate levels of vitamin D in their body⁹.

It was shown that patients with a vitamin D deficiency were 14 times more likely to suffer a severe case of COVID-19. The mortality rate of people with vitamin D deficiency was 25.6%

compared to 2.3% from those with sufficient levels of vitamin. Recent studies suggest that vitamin D deficiency is one of the factors responsible for increasing risk for more severe disease regardless of age or weight and risk of getting infected with COVID-19⁹.

Conclusions

Studies have shown that taking vitamin D supplementation has positive effects against respiratory tract infections. Therefore those who are at higher risk of vitamin deficiency should consider taking vitamin supplementation to maintain the vitamin levels in their body. Some studies demonstrated a link between vitamin D and COVID-19 cases while other studies did not find enough evidence to confirm the connection between two factors mentioned above when confounding variables are adjusted. Therefore, more large-scale studies are necessary to test this hypothesis¹⁰.

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