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Mini Review

The Role of Vitamins K2-7, D3, B12, Magnesium and Zinc in Health Outcomes of COVID-19 Patients

Anaya Vora[1] and Alok S Shah[2]*

[1]*Aditya Birla World Academy, Mumbai, India*

[2]*Pulmonary Department, University of Chicago, USA*

***Corresponding Author:** Alok S Shah, Pulmonary Department, University of Chicago, USA.

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Abstract

To identify the effect of vitamins in COVID-19 patients. It is thought that vitamins have helped the patient's immunity and have improved their chances of survival against the COVID-19 disease. There have been many proposed methods of battling COVID-19 however, there has been little to no attention given to the benefits of vitamins. In this article, we will be looking at the different ways that vitamins have benefited COVID-19 patients. We will look at vitamins such as Vitamin D, K2-7, B12, C, Mg and Zinc; and see how they have helped patients suffering from COVID-19. Studies have shown a reduced need of oxygen support and intensive care in older patients that were administered DBM vitamins.

Keywords: *Vitamins; COVID-19; Immunity*

Introduction

This year the world has experienced a pandemic caused by a virus we have not been familiar with; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2, or more commonly known as COVID-19. COVID-19 is a strain of the corona virus family that is known to cause respiratory diseases in humans. It is an RNA virus that contains positive-sense single-stranded RNA of approximately 27 - 37 kb [1]. COVID-19 uses its trimeric spike glycoprotein to bind to and enter the host cells [2]. The virus infects humans, other mammals, and birds, and can be asymptomatic or cause severe respiratory, digestive and genital organ issues [1]. Symptoms of the virus are similar to that of a common cold: cough, tiredness, shortness of breath, fever, sore throat, headache, loss of smell, chest pain etc. however, the consequences and transmission are undoubtedly more severe [3]. These symptoms appear generally after 14 days of infection, this is the incubation period of the virus. The virus is easily transmittable and can infect anyone within a 6 feet radius of the infected individual. The virus spreads in droplets that form when an infected individual speaks, sneezes or cough. These droplets are then inhaled by others or land on objects that come in contact with others thus infecting them as well [3]. This virus has hit some demographics harder than others, elderly and people with underlying health issues that include asthma, heart diseases and diabetes are more susceptible to the corona virus and are at a higher risk. This is due to the fact that the respiratory system and other organs are weakened [4].

Since this pandemic has spread, researchers all over the world have been searching for a cure, however, the development of a vaccine takes time and effort. Therefore, until a vaccine can be made, there are other methods that doctors have tried such as hydroxychloroquine, anti-malaria drugs and Remdesivir. Hydroxychloroquine is used to reduce fever and inflammation, some studies showed that it may have had the ability to reduce the durations of the symptoms of the virus [5]. Remdesivir is an investigational broad-spectrum antiviral treatment [6]. Researchers have tried these methods continue to find new and more effective cures for this virus, however, one area that many

have over looked are the vitamins. There are various vitamins that have shown improvements in patients suffering from COVID-19. Some of the vitamins that have helped patients are: Vitamin D, Vitamin K2-7, Vitamin B12, Vitamin C, Magnesium and Zinc.

Vitamin D

Vitamin D is a fat-soluble vitamin that is formed when ultraviolet rays from the sun trigger the synthesis of vitamin D, it is also found in a few foods. This vitamin D is inert and must go through 2 sets of hydroxylation in the body to activate it. The first of these reactions occurs in the liver where vitamin D is converted to 25-hydroxyvitamin D, which is the converted to 25-dihydroxyvitamin D in the kidney [7]. Vitamin D promotes the absorption of calcium, modulates cell growth, helps in immune and neuromuscular functions and reduces inflammation [7]. The healthy level of vitamin D in the blood is 20 nanograms per milliliter, patients who have vitamin D levels below 12 nanograms per milliliter are deficient and may have a harder time battling COVID-19 [9].

A correlation between high mortality rates and low vitamin D levels was found by researchers at Northwestern University [8]. This is due to the fact that vitamin D reduces the inflammation caused by COVID-19 in lungs allowing for better respiration and reduced need of ventilators. Other researchers have found that patients with the lowest levels of vitamin D were in critical conditions whereas the patients who suffered from mild conditions had high levels of vitamin D in their blood [9]. The dosage that should be administered for vitamin D is 1000 IU.

Vitamin K 2-7

Vitamin K activates proteins that help in cardiovascular health, clotting of blood, and calcium metabolism. There are two main forms of vitamin K: K1 and K2. Vitamin K2 has helped reduce blood vessel calcification and improve bone and heart health [10]. A study has shown a Vitamin K deficiency has been linked to severe cases of COVID-19 in addition to other complications such as hypertension, cardiovascular diseases and type 2 diabetes, it has also been associated with the degradation of elastin. Patients administered with Vitamin K have showed a decelerated progression of aortic valve calcification, bone loss and arterial stiffness [11]. The dosage that should be administered to patients is 50 micro grams.

Vitamin B12

Vitamin B12 is water soluble and contains the mineral cobalt and is naturally found in some foods. It is required for proper neurological function, DNA synthesis and formation of red blood cells and is a cofactor in methionine synthesis [12]. The appropriate dosage for vitamin B12 administration is 500 mg.

Vitamin C

Vitamin C is also known as L-ascorbic acid and is water soluble. It is a dietary requirement as it has multiple benefits, it is used in certain neurotransmitters, biosynthesis of collagen, metabolic reactions, physiological antioxidant and helps to regenerate other antioxidants. In addition to this, vitamin C plays an important role in the immune system [13]. It helps the T-cells and phagocytes to function more effectively [15]. Therefore, if the immune system is working effectively and the phagocytes are active, then there is a better chance to fight off the virus. A review suggested that Vitamin C may help patents recover form COVID-19 faster and may eliminate the need for ventilators and life support [14]. Studies have shown a beneficial effects in elderly people with acute respiratory infections, reduced the stay of patients in the hospital and duration of the use of ventilator [15]. The dosage that should be administered for vitamin C is 500 mg.

Magnesium

Magnesium is an essential mineral and helps to keep the immune system working properly. Studies have shown that magnesium is a cofactor of immunoglobulin, T helper-B cell adherence, the binding of antigens to macrophage RNA, antibody-dependent cytolysis, and

immune cell adherence [16]. Consuming excess amounts of magnesium may lead to other complications such as gastrointestinal problems [17], therefore, it is important to know the correct amount of magnesium to take, the average dose is 150 mg.

Zinc

Zinc has many properties and helps the body in many different way, including helping the immune system. Some of the main functions of zinc is treating colds, fighting infection and heal wounds [18]. Researchers have claimed that zinc can reduce inflammation and clear up the lungs in COVID-19, this will also reduce the use of ventilators. This has been connected to zinc's anti-inflammatory property [19]. The approximate dose is 10 mg.

Conclusion

After looking at and analysing these research papers, it is safe to consider the fact that vitamins have a beneficial effect on the body and helps the body to fight the virus. There has also been a record of reduced use of ventilators in COVID-19 patients who have consumed vitamins. The vitamins have also increased immunity in people and have helped them fend off the virus or reduce the severity of the virus. The papers have also mentioned a faster recovery in patients who have taken vitamins. It is also important to remember that the dosages must be taken according to the patients age and other factors and with consultation from doctors. Overall, the vitamins help in reducing the effects of the symptoms and boosts immunity.

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