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Systematic Review: Improving Body Immunity through Consumption of Vitamins in Facing COVID-19

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ABSTRACT

COVID-19 was declared an international pandemic after it was first reported in 2019 in Wuhan, China and caused a public emergency not only in Indonesia but throughout the world. Efforts to prevent the transmission of the COVID-19 virus are very important because there is still no specific drug to deal with COVID-19. The healing of a person with COVID-19 is strongly influenced by the body's immunity, including by consuming vitamins B, C, D, E and Zinc. The purpose of this study was to find out how to increase the body's immune system through the consumption of vitamins in the face of the COVID-19 pandemic. The design of this study uses a systematic review, namely library research that examines critically quality health journals, which have been filtered with inclusion criteria and uses several databases of Google Scholar, Pubmed, Science Direct and Research Gate as literacy in this study. There are 350 journals according to keywords which are filtered into 7 journals according to the theme and analyzed which examines increasing the body's immunity with vitamin B, C, D, E and Zinc supplementation. The results showed that the potential of vitamins to increase the body's immunity in the prevention of COVID-19.

Keywords: covid-19, immunity, vitamin

INTRODUCTION

In 2019, precisely on December 31, the Wuhan hospital, Hubei, China, reported a case with pneumonia of unknown cause. The World Health Organization (WHO) declared COVID-19 a Public Health Emergency of International Concern (PHEIC) and was declared an epidemic on January 30, 2020. On March 12, 2020 the first 2 COVID-19 cases were reported in Indonesia. COVID-19 cases in Indonesia in August 2021 continued to experience a spike in cases of 3.6 million with 104 thousand deaths (Widayanti & Kusumawati, 2021). The cause of the spike in COVID-19 cases is due to the emergence of a new variant, namely the delta variant. This variant has a transmission rate characteristic of six times faster than the alpha variant (Mahase, 2021).

Corona virus is actually no stranger to the world of animal health, but only a few types are capable of infecting humans to become pneumonia. This case is suspected to be related to the Huanan animal market in Wuhan, which sells various types of animal meat, including those that are not commonly consumed such as snakes, bats, and various types of rats. With this background, the Corona Virus is not the only time that the world's citizens are panicking. Having symptoms that are both similar to the flu, the Corona Virus grows rapidly to cause more severe infections and organ failure (Hidayah et al., 2020).

Many efforts have been made to prevent the spread of the COVID-19 virus. Preventive measures are very important because flu caused by a virus is self-limiting and no specific drug has yet

been found to treat COVID-19 (Ardiaria, 2020). Many efforts have been made to prevent the spread of the COVID-19 virus. Preventive measures are very important because flu caused by a virus is self-limiting and no specific drug has yet been found to treat COVID-19 (Ardiaria, 2020). One way to prevent the outbreak of the COVID-19 virus is to take vitamins (Lidia et al., 2020). There are many types of vitamins that can be useful for increasing immunity during a pandemic, but the most consumed during COVID-19 are vitamins B, C, D, E, and Zinc which are scientifically known to increase body immunity and act as antioxidants. (Health, 2016; Judistiani et al., 2019; Lewis et al., 2020; Pacier & Martirosyan, 2015).

Vitamin C is a micronutrient that plays an important role for humans. This powerful antioxidant is important for the production of collagen and carnitine which contribute to immune enhancement and defense. Even vitamin C also acts as an antimicrobial agent that can fight various microorganisms that cause infection. Vitamin C is believed to be able to prevent and treat respiratory infections by enhancing various immune cell functions. Research shows that administering vitamin C to patients with acute respiratory tract infections can restore their plasma vitamin C levels to normal, thereby improving the severity of symptoms of the infection (Hidayah et al., 2020).

Fat soluble vitamins D and E contain antioxidants and free radical scavengers can help in increasing the body's resistance, when the immune system is strong it will help in preventing the transmission of COVID-19 (Kementerian Kesehatan Republik Indonesia, 2021). Vitamin D has a positive effect on the body's immune system. There are several hypothesized mechanisms that vitamin D may reduce the risk of infection. Some of these mechanisms are through the induction of cathelicidin and defensins which can reduce the rate of viral replication and reduce the concentration of proinflammatory cytokines. Death in cases of influenza usually occurs due to excessive inflammatory response in the respiratory organs, in the form of severe pneumonia, causing respiratory failure (Grant et al., 2020).

Zinc can increase mucociliary clearance to remove bacteria and particles containing viruses (Skalny et al., 2020). Zinc also has antiviral activity through inhibition of RNA-dependent RNA polymerase (RdRp) and interrupts further viral RNA replication as in SARS-CoV. (Skalny et al., 2020). Not only that, zinc has anti-inflammatory activity through inhibition of NF-B, it can cause downregulation of proinflammatory cytokine production (Skalny et al., 2020). Zinc-induced inhibition of the growth of S. pneumoniae is also useful for treating infections in COVID-19 (Health, 2016).

Due to the increasing number of COVID-19 cases in Indonesia every day, the author would like to examine the improvement of the body's immune system through the consumption of vitamins in the face of the COVID-19 pandemic by reviewing and reviewing several relevant literatures and sources and then forming a final result. With the aim that in the future it can be a reference as well as a source of health studies, especially during the pandemic. And most importantly can educate the public about the importance of health during the COVID-19 pandemic.

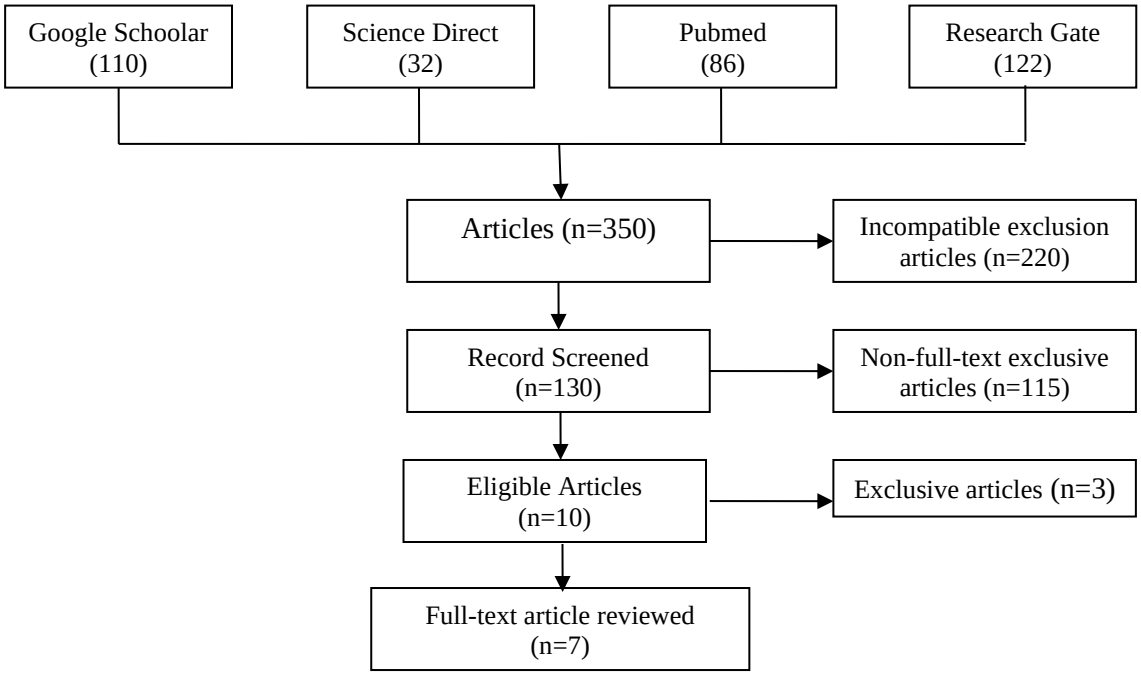
METHODS

The method used in writing this article is a systematic review, namely library research that critically examines knowledge, ideas, or even findings in quality health journals, compiled and structured theoretically and methodologically for a particular topic (Lau & Kuziemsky, 2016). The strategy used in the article search is to use research articles that match the topic in the Google Scholar, Pubmed, Science Direct and Research Gate databases.

This systematic review is limited to searching literature in the last 6 years (2015-2021) using the following keywords “COVID-19”, “SARS-CoV-2”, and “Covid-19 prevention”, “Multivitamins prevent COVID-19 ”, “Vit B”, “Vit C”, “Vit D”, “Vit E”, “Zink” with the determination of questions following the PICO technique. Where each question P is a sample with or without COVID-19, I is an intervention Supplementation of vitamins B, C, D, E and Zink in an experimental study, C is a sample without vitamin C administration in the treatment process or with a placebo, O is the healing process or Covid-19 prevention. The inclusion criteria in this literature review are full-text articles, in Indonesian and English published in the last 6 years, research articles in which two or more keywords are searched in the database. The flow of the journal review is adjusted to the following figure.

Figure 1 Flow Diagram of Search and data extraction

Full-text articles were examined to select research journals that matched the sample inclusion criteria. A total of 10 articles were obtained that met the inclusion criteria and relevant abstracts to be analyzed about increasing the body's immunity to prevent the occurrence of COVID-19.



RESULTS

No	Study Titles, Authors, Year	Summary of Results
1	Zinc as nutritional intervention and prevention measure for COVID–19 disease (Mossink, 2020)	In patients who suffer from hypotension, it has the potential to increase susceptibility to COVID-19. This is because various hypotensive drugs can affect zinc balance which has an impact on impaired immune function (immunity), so that it can increase susceptibility to covid.
2	Quercetin and Vitamin C: An Experimental, Synergistic Therapy for the Prevention and Treatment of SARS-CoV-2 Related Disease (COVID-19) (Colunga Biancatelli et al., 2020)	Ascorbic acid or vitamin C is an important vitamin needed by the immune system (immunity). It shows positive results when given to critically ill people. Quercetin is a well-known flavonoid whose antiviral properties have been investigated in many studies. The combination of these two compounds is used for the prophylaxis and initial treatment of respiratory tract infections, especially in COVID-19 patients.
3	Coronavirus disease (COVID-19) and immunity booster green foods: A mini review (Arshad et al., 2020)	1. People with low immunity are susceptible to the COVID-19 virus. 2. The test results prove that vitamins C, D, and E provide an important aspect in increasing immunity (immunity). 3. Fruits and vegetables that contain vitamin C are good for immunity. 4. Vitamin D increases cellular resistance, in part by increasing the cytokine storm caused by the innate immune system. 5. Leafy greens like broccoli and kale are pretty quick immune boosters.
4	Regulatory role of vitamin E in the immune system and Inflammation (Lewis et al., 2020)	1. The mechanism by which vitamin E exerts its effects is both directly through alterations in cell membrane function and cell signaling pathways and indirectly through modulation of inflammatory mediators including the production of PGE2 and cytokines. 2. Vitamin E can modulate other types of immune cells culminating in an enhanced immune response and a reduced risk of immune-related diseases. 3. Individual responses to vitamin E vary depending on several factors including age, health condition, nutritional status, and genetic heterogeneity. 4. Vitamin E is more effective in improving age-related immune dysfunction and enhancing protective immune responses against pathogens. 5. The immunomodulatory effects of vitamin E supplements have been shown to be beneficial in reducing some viral, bacterial, and allergic diseases such as asthma.
5	The Role of Vitamin E in Immunity (Lee & Han, 2018)	1. Vitamin E has been shown to enhance immune responses in animal and human models and to provide protection against several infectious diseases. 2. Different forms of vitamin E exert different effects on immune cells. 3. The cell-specific effects of vitamin E provide valuable evidence regarding the immunomodulatory

		mechanisms of vitamin E, but interactions between immune cells should not be ignored, because interactions between immune cells are important in the regulation of immune function.
6	The Benefits of Vitamin D Supplementation for Athletes: Better Performance and Reduced Risk of COVID-19 (Grant et al., 2020)	Athletes and those associated with them can benefit from better athletic performance, better health, and reduced risk of COVID-19 by maintaining serum 25(OH)D concentrations above 40 ng/mL. To achieve these concentrations can take vitamin D3 supplementation maybe 4000-10,000 IU/day depending on body size, skin pigmentation, and other personal factors. A dose of 10,000 IU/day will produce a good serum vitamin D concentration within a few months. If higher concentrations are desired sooner for sports performance or to avoid COVID-19, one should consider starting with a bolus dose. Vitamin D supplementation can be useful in reducing the risk of COVID-19 and its severity, but it should not be the only measure used. Athletes must also follow official guidelines such as: about wearing masks, social distancing, and regular tests
7	Can vitamin B12 be an adjuvant to COVID-19 treatment? (Santos, 2020)	1. Vitamin B12 therapy reduces oxidative stress, improves circulation and acts as an anti-inflammatory and analgesic, thereby reducing the damage to COVID-19 patients. 2. Vitamin B12 (Methylcobalamin) has a high safety profile; its use by COVID-19 patients will be very beneficial.

DISCUSSION

Mossink, et al (2020) conducted research on zinc as nutritional intervention and prevention measures for COVID-19 disease. Epidemiological studies and observational studies indicate zinc depletion at high risk for COVID-19. In patients who suffer from hypotension (low blood pressure), it has the potential to increase susceptibility to COVID-19. This is because various hypotensive drugs can affect zinc balance, worsening zinc homeostasis in individuals who are already mildly zinc deficient. Disrupted zinc homeostasis resulting in impaired immune function is hypothesized to increase susceptibility to COVID-19. Therefore, correcting low zinc status in risk groups may play an important role in preventing and controlling COVID-19 disease. Studies have shown that zinc depletion in hypertension can be improved by dietary adjustments or zinc supplementation, with the added benefit of improving glycemic regulation and reducing inflammation.

Biancatelli et al., (2020) conducted research on quercetin and vitamin c: an experimental, synergistic therapy for the prevention and treatment of sars-cov-2 related disease (COVID-19). In this study, it was found that vitamin C exerts immunomodulatory activity, increases interferon production through STAT3 phosphorylation, limits cytokine-induced organ damage, promotes survival in deadly infections, is able to recycle oxidized quercetin, and enhances its antiviral effect. Cytokine dysregulation is associated with extracellular neutrophil trapping and altered T cell activity. Quercetin is a well-known flavonoid whose antiviral properties have been investigated in many studies. In the present study, coadministration of Vitamin C and quercetin may represent a safe, effective, and inexpensive antiviral and immunomodulatory approach for the prophylaxis of high-risk populations and the treatment of mild and severe cases.

Arshad et al., (2020) conducting research on coronavirus disease (COVID-19) and immunity booster green foods. In this study explained that the first foods rich in magnesium are dark brown, black beans, avocados, and seeds help the hemoglobin in our blood which is responsible for delivering oxygen from our lungs to the rest of the human body, which helps in COVID infection. -19 because the virus attacks the respiratory system. Secondly, some of the benefits of vitamin D as a prevention and treatment of the COVID-19 virus, among others: (1) vitamin D increases cellular resistance, by increasing the cytokine storm as a cause of the immune system, (2) vitamin D can reduce the development of pro-inflammatory Th1 cytokines, which known as tumor necrosis factor and interferon, (3) vitamin D decreases the production of pro-inflammatory cytokines and increases the production of anti-inflammatory cytokines by macrophages, (4) supplementation with vitamin D also increases the production of anti-oxidation-related genes (glutathione reductase and subunits). controller (glutamate-cysteine ligase). The three fruits such as oranges, papaya, kiwi, and guava are rich in vitamin C, while vegetables such as eggplant, bell peppers, beets, spinach, and cauliflower are known to be quite rich in vitamin C and good for the immune system.

Lewis et al., (2020) conducted research on the regulatory role of vitamin E in the immune system and inflammation. In this study, it is explained that vitamin E can exert an effect both directly through changes in cell membrane function and cell signaling pathways and indirectly through modulating inflammatory mediators including the production of PGE2 and cytokines. In addition, vitamin E can modulate other types of immune cells, culminating in an enhanced immune response and a reduced risk of immune-related diseases. Vitamin E can modulate other types of immune cells culminating in an enhanced immune response and a reduced risk of immune-related diseases. The immunomodulatory effects of vitamin E supplements have been shown to be beneficial in reducing some viral, bacterial, and allergic diseases such as asthma.

Lee & Han, (2018) conducting research on the role of vitamin E in immunity. In this study it was found that vitamin E has been shown to enhance immune responses in animal and human models and to provide protection against several infectious diseases. The suggested mechanisms involved with this alteration are (1) reduction of PGE2 production by inhibition of COX2 activity mediated through decreased NO production, (2) increased formation of effective immune synapses on naive T cells and initiation of T cell activation signals, and (3) modulation of Th1/Th2 balance. NK activity and changes in dendritic function such as lower IL-12 production and migration were observed with vitamin E. Different forms of vitamin E exert different effects on immune cells. The cell-specific effects of vitamin E provide valuable evidence regarding the immunomodulatory mechanisms of vitamin E, but interactions between immune cells should not be ignored, because interactions between immune cells are important in the regulation of immune function.

Grant et al., (2020) conducted research on the benefits of vitamin d supplementation for athletes: better performance and reduced risk of COVID-19. In this study it was found that athletes and those associated with them can benefit from better athletic performance, better health, and reduced risk of COVID-19 by maintaining serum 25(OH)D concentrations above 40 ng/mL. . To achieve these concentrations can take vitamin D3 supplementation maybe 4000-10,000 IU/day depending on body size, skin pigmentation, and other personal factors. A dose of 10,000 IU/day will produce a good serum vitamin D concentration within a few months. If higher concentrations are desired sooner for sports performance or to avoid COVID-19, one should consider starting with a bolus dose. Vitamin D supplementation can be useful in reducing the risk of COVID-19 and its severity, but it should not be the only measure used. Athletes must also follow official guidelines such as: about wearing masks, social distancing, and regular tests.

Santos, (2020) conducted a study on "can vitamin B12 be an adjuvant to COVID-19 treatment?". Therefore, vitamin B12 (Methylcobalamin) has a high safety profile; its use by COVID-19 patients may be of great benefit. Considering that COVID interferes with the absorption of vitamin

B12, patients infected with this virus will develop symptoms that are also common in cases of deficiency of this vitamin. Therefore, the use of methylcobalamin in patients with COVID-19 infection could be an alternative treatment for this pandemic.

CONCLUSION

Coronavirus Disease 2019 (COVID-19) is an infectious disease with the main symptoms of fever, cough, flu and dyspnea. Until now there is no treatment that can specifically fight COVID-19. From the results of research journals in a systematic way, it shows the potential of multivitamins (Vit B, C, D, E and Zink) to increase body immunity in preventing COVID-19, with various mechanisms so that the use of multivitamins in the community may be clinically feasible in both treatment and prevention.

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