

Zinc and Selenium Deficiency Leads to Worse COVID Outcomes

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✓ Fact Checked

STORY AT-A-GLANCE

- › Data from Belgium reveal that patients with zinc and selenium deficiencies, especially those with comorbidities associated with worse COVID outcomes, had a higher risk of mortality and severe disease
- › Up to 1 billion worldwide may be deficient in selenium with symptoms that can include hair loss, fatigue, weight gain, immune system and cognitive decline
- › Zinc deficiency may affect up to 2 billion worldwide and may be responsible for more than 450,000 deaths every year in children younger than 5 years. Signs of deficiency may include, weak immunity, lack of appetite, hair loss, acne and a loss of taste and smell
- › The role of zinc in the fight against coronaviruses has been known since at least 2010; zinc requires help getting into the cell to fight viruses. Although hydroxychloroquine is effective, new data show quercetin may have the same function, while being less expensive and more easily obtained
- › Choose foods high in zinc and selenium, including pasture-raised beef or chicken, pasture-raised eggs, pumpkin seeds, Brazil nuts and sardines

Yet another study¹ has demonstrated the significance and importance of adequate levels of zinc and selenium in patients who have COVID-19, and especially in those who have underlined comorbidities identified to increase the severity of disease. These include high blood pressure, respiratory disease, obesity, cancer and Type 2 diabetes.

The human body is a complex organism that uses multiple essential vitamins, minerals and elements to maintain optimal health. Selenium and zinc are two nutraceuticals that are important to immune health and a variety of other functions. While these two are important, it is crucial to understand they are part of your body's overall requirements for health and wellness.

This means it's important to recognize the roles zinc and selenium play while you seek to obtain a balance of other vitamins and minerals to support your health. Zinc is the second most abundant trace mineral found in the human body.² While vital to health, your body cannot store it. You must consume foods with zinc every day to meet your body's needs.

Zinc is essential for the proper function of over 100 enzymes that relate to your brain, bones, kidneys, liver, pancreas and muscle development.³ You may be familiar with the role that zinc plays in curtailing the common cold as research has found it can reduce the length of your cold by an average of 33%.⁴

Selenium is an important element your body uses to inhibit RNA virus replication and mutations.⁵ The mineral was discovered in 1817. Selenium is added to the manufacture of glass and to make pigments for ceramics, paints and plastics.⁶ You may be familiar with dandruff shampoo containing selenium since it's toxic to the yeast-like fungus that creates dandruff.⁷

Deficits Together With Comorbidities Lead to Worse Outcomes

Seeking predictive markers to better stratify patients at hospital admission, researchers engaged a cross-sectional study⁸ of 138 patients admitted to Ghent University Hospital and A Z Jan Palfijn Hospital in Ghent, Belgium. On admission, levels of trace elements were determined using serum or plasma levels for selenium, zinc, iron and copper.

Researchers also measured selenoprotein p levels, which require selenium for full expression. These enzymatically active proteins include glutathione peroxidases, thioredoxin reductases or iodothyronine deiodinases. The crucial role these enzymes

play in regulating reactive oxygen species means selenium is closely related to your immune and inflammatory responses.

The patients were aged 18 to 100 years with a positive COVID-19 diagnosis and 52% were over the age of 65 years. Additionally, 17% of the participants were over 80 years old. Data on age, diagnosis and sex were available for both study locations.

However, information on risk factors and comorbidities, such as Type 2 diabetes, cancer and obesity, were only available at UZ Gent identified as Study 1, and not at JPH Ghent, identified as Study 2.⁹ There were 79 participants in Study 1 and 59 participants in Study 2.

The researchers separated the classification for severity of disease into five categories. However, there were only 15 patients in category A who had mild disease. Therefore, the first and second classifications were merged into a category of patients who had low oxygen requirements for data processing.

On admission to the hospital, all patients in Study 1 had blood work to measure copper, iron, zinc and selenium status. Patients were then stratified into male and female, above and below age 65 and with or without comorbidities. The researchers found that copper levels were adequate in most of the patients and iron levels were higher in males than in females.

Patients with cancer had significant deficits in selenium and zinc. Three of the five patients with the lowest levels of iron, who also had profound selenium and zinc deficits, died during the study. Analysis of the data demonstrated that there were particularly low levels of selenium and zinc in the majority of patients who were hospitalized at one of two hospital sites.

When patients with comorbidities were analyzed, there was a pronounced deficit in selenium, zinc and iron in cancer patients and a higher survival chance in those cancer patients with higher levels of selenium.

Disease severity was associated with low levels of selenium and mortality was associated with zinc deficiency, particularly in patients with diabetes. However, the

majority of those who died had a combination of selenium and zinc deficit. The researchers concluded that the data confirmed:¹⁰

“... an insufficient Se (total Se and SELENOP) and Zn status at admission to the hospital is associated with an exceptionally high mortality risk and severe disease course with COVID-19.

In view of the predictive accuracy of Se and Zn deficiency as mortality risk factor at hospital admission, supplemental Se and Zn supply should be considered to support the immune system, in particular for patients with inflammation-related comorbidities like cancer or diabetes mellitus.”

How the Body Uses Selenium and Signs of Deficiency

The results of this study support another published in Environmental Research¹¹ in early 2021 that demonstrated a relationship between selenium and severity of coronavirus disease. The writers of the paper proposed that insufficiency or deficiency could be a crucial factor in the development of severe acute respiratory syndrome from an infection with SARS-CoV-2.

The data looked at the relationship between soil levels of selenium in different cities in Hubei Province, China, and the incidence and severity of COVID-19 in those areas. They found baseline information that demonstrated selenium had an effect on the prevention and management of the infection.

Selenium is a nutritionally essential trace mineral found in foods and is necessary for the optimal function for many antioxidants.¹² For example, selenium is required for the expression of five identified glutathione peroxidases,¹³ which reduce the damage from reactive oxygen species. These enzymes are also important in male fertility.

Selenium is found in the soil where it concentrates in plant foods. However, experts estimate that up to 1 billion people worldwide may be affected by a selenium deficiency due to inadequate intake.¹⁴ Those who have a deficiency in selenium are at higher risk of

conditions that affect the endocrine system, cardiovascular system, immune system and reproductive system and that may affect mood and behavior.

Although it's necessary to have plasma or serum testing to determine if you are deficient, there are several symptoms that may indicate you aren't getting enough selenium in your diet. These can include:^{15,16,17}

Hair loss	Fatigue
Weight gain	Sick more often
Greater oxidative stress	Shortness of breath
Cognitive decline	Muscle weakness

Zinc Is Crucial for Immune Function

If you were not aware before COVID-19 that zinc helps shorten the length of viral illnesses, you probably have heard it since. Zinc is found in many cold preparations and is essential to cellular metabolism. Severe deficiency is rare¹⁸ and often associated with an inherited condition called acrodermatitis enteropathica.

However, acquired deficiency or insufficiency is possible through a lack of dietary intake, malabsorption syndrome or chronic alcoholism. According to Oregon State University,¹⁹ deficiency may affect up to 2 billion people worldwide. Zinc deficiency is attributed to more than 450,000 deaths every year in children under the age of 5.

Signs of zinc deficiency or high levels of insufficiency are related to the functions zinc has in the body.²⁰ This includes poor neurological function.²¹ Zinc plays a strong role in your immune system, so low levels can lead to weak immunity.

Persistent diarrhea,²² lack of appetite and hair loss are attributed to insufficient levels of zinc. Individuals with resistant acne may consider a zinc insufficiency,²³ or those who have lost the sense of taste and smell.²⁴

Quercetin Improves Function of Zinc in COVID-19

In 2010,²⁵ researchers recognized the intracellular function of zinc against coronaviruses, and the need for zinc ionophores to actively transport zinc into the cell. During 2020, treatment with hydroxychloroquine, a zinc ionophore, with zinc and azithromycin, was published²⁶ by Dr. Vladimir Zelenko who experienced significant success with them in his patient population.

Since that time, two studies have been published that demonstrate the function of quercetin is safe, far less expensive and much easier to obtain than hydroxychloroquine. In the first study,²⁷ there were 42 outpatients with COVID-19 who were divided to receive standard medical therapy or standard therapy with 600 milligrams (mg) of quercetin for seven days, followed by another seven days of 400 mg per day.

After one week, 16 of the 21 in the group taking quercetin tested negative for COVID-19 and 12 reported all symptoms had diminished. In the second study,²⁸ researchers gave 152 outpatients with COVID-19 a daily dose of 1,000 mg of quercetin for 30 days.

The scientists found there was a reduction in frequency and length of hospitalization in the patient group. There were also less need for noninvasive oxygen therapy and lower numbers of individuals who were admitted to the intensive care unit. They concluded:²⁹

“QP (Quercetin Phytosome®) is a safe agent and in combination with standard care, when used in the early stage of viral infection, could aid in improving the early symptoms and help in preventing the severity of COVID-19 disease. It is suggested that a double-blind, placebo-controlled study should be urgently carried out to confirm the results of our study.”

Food Choices High in Zinc and Selenium

I recommend getting as many of your essential vitamins, minerals and elements from your diet as possible. The recommended daily allowance for zinc ranges from 2 mg for infants to 11 mg to 8 mg for men and women over the age of 19.³⁰ Food sources include

oysters, pasture raised beef, dark meat chicken, pumpkin seeds and dry roasted cashews.

The recommended daily allowance for selenium ranges from 15 micrograms (mcg) for infants to 55 mcg for men and women over 19 years.³¹ The best food sources of selenium are Brazil nuts. Just six to eight nuts deliver 544 mcg, or 989% of your daily allowance. Other sources include sardines, pasture raised beef, turkey, chicken and pasture-raised eggs.

For a short time, while you're ill, it may be helpful to supplement with zinc and selenium. Supplementation with zinc greater than the upper intake level for one to two weeks during a cold has not resulted in serious side effects.³² However, long-term consumption can result in a copper deficiency, which affects your immune system.

Dietary supplements for selenium can be found in multivitamins and as a standalone product. Data demonstrates supplementation lowers total plasma cholesterol but does not prevent heart disease. In one study³³ reported by the NIH, selenium in combination with vitamins C and E, beta carotene and zinc improved memory and semantic fluency test scores.

Sources and References

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