

Is there a role for vitamin C in Covid?

While vitamin C won't prevent you from being infected with Covid-19, the potential benefits it provides in supporting you to fight infection makes it well worth prioritising, argues Associate Professor Anitra Carr

Comment: Vitamin C has well-known immune-supportive functions and, consequently, worldwide sales for vitamin C supplements and vitamin C-rich foods, such as citrus and kiwifruit, have soared since the novel coronavirus pandemic. A similar phenomenon occurred during the 1918 influenza pandemic when the demand for citrus outstripped supply.

Anecdotally, one sufferer of Covid-19 recently shared: "I was exposed to Covid-19 in late December and fell seriously ill. Everyone has a different experience with the virus but what stuck out to me was my constant craving for orange juice, I drank gallons of it, which I usually don't drink. The sickness passed and I stopped craving it".

Humans cannot make vitamin C due to genetic mutations that have eliminated our ability to make the vitamin in our livers as most other animals do. As a result, we have to obtain the vitamin through our diet, primarily from fresh fruit and vegetables, in order to survive.

Because vitamin C is water-soluble, it is not stored by the body, so if we don't get enough vitamin C through our diet this results in potentially fatal deficiency.

Vitamin C has numerous important functions. Along with being one of the most potent antioxidants in the body, it also has anti-inflammatory properties and supports various white blood cell functions. Of note, people with chronic vitamin C deficiency are very prone to developing severe respiratory infections such as pneumonia.

Studies carried out by University of Otago researchers in patients with pneumonia and sepsis have shown severely depleted levels of vitamin C in their blood, with the lowest levels being observed in those with sepsis. Sepsis is a potentially life-threatening condition comprising the body's uncontrolled inflammatory response to a severe infection.

Both pneumonia and sepsis are common complications of severe Covid-19 and often result in the patient requiring admission to the ICU for respiratory support. International studies have shown these people have the lowest vitamin C levels of all.

While selected vitamin deficiencies are associated with many infectious diseases, the efficacy of supplementation is less proven. This is because the gold standard test for the efficacy of an intervention is the randomised controlled trial (or RCT).

However, this type of trial is designed for testing new pharmaceutical drugs, for example, and does not work so well in the case of vitamins, where everyone in the control (non-treatment) group is already consuming variable amounts of the vitamin through their daily diet.

In many cases, they may already be consuming an adequate amount, so any additional vitamin is unlikely to have a significant effect. In other words, you can't make a wet sponge any wetter.

However, in the case of severe infections such as pneumonia, sepsis, and Covid-19, it is known that people's vitamin C levels will already be very low, so supplementation might be expected to have more of an effect.

In support of this, a handful of trials in adults and children with pneumonia have shown a decreased duration of hospital stay and decreased severity of symptoms in the most severely ill patients receiving vitamin C.

As the severity of the illness increases, so does the demand for vitamin C. This is why intravenous vitamin C is usually used in critically ill ICU patients, because oral doses are not able to get enough vitamin C into the body when you are very sick.

Over the past few years there has been an upsurge in interest around the use of intravenous vitamin C in critically ill patients with sepsis after some initially encouraging trials in the United States.

The largest trial to date was carried out in septic patients with acute lung injury and was published in the prestigious American journal JAMA in 2019. This trial showed a 36 percent decrease in mortality and decreases in ICU and hospital length of stay in the patients who received intravenous vitamin C.

In 2020, the World Health Organization highlighted vitamin C as a potential adjunctive therapy with biologic plausibility for patients with critical Covid-19, based on the earlier vitamin C intervention trials in patients with sepsis.

To date, there have been a handful of small RCTs investigating both oral and intravenous vitamin C for coronavirus infection and Covid-19. The first trial to be published came out of Wuhan, China and showed improvement in lung oxygenation and a decrease in mortality in the most severely ill patients who received vitamin C infusions.

Analysis of another trial carried out in the United States showed a 70 percent faster rate of recovery in the patients with coronavirus infection who received oral vitamin C.

The recently published vitamin C and Covid-19 trials are small and of lower quality, therefore larger multi-centre trials are currently underway, and these will hopefully provide more definitive results.

What can you do in the interim?

Vitamin C supplementation will not prevent you from getting coronavirus infection, just as it will not necessarily prevent you from getting the common cold (which can also be caused by coronaviruses).

However, numerous clinical trials have indicated that regular vitamin C supplementation can decrease the severity and the duration of colds and also decrease the risk of developing pneumonia.

If you do come down with a respiratory infection, whether coronavirus or not, increasing your vitamin C intake, along with other immune-supportive micronutrients, may help support your immune system enough that the infection does not progress to the more severe complications of pneumonia, sepsis or Covid-19 requiring hospitalisation.

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**The author declares no conflicts of interest*