

Role of micronutrients in the management of coronavirus disease 2019

M. AbdAllah¹, H. Ez Elarab², E. Raslan³, L. Saber⁴,
E. Daoud¹ and M. Saber¹

¹ Complementary Medicine Department, Medical Research Division, National Research Centre, Giza, Egypt, ² Department of Community, Environmental and Occupational Medicine, Faculty of Medicine, Ain Shams University, ³ Family Medicine Department, Faculty of Medicine, Cairo University and ⁴ Department of Medical Biochemistry, Al-Azhar University, Cairo, Egypt

Abstract

Micronutrients play an important role in enhancing the immune system, therefore, proper nutritional support of micronutrients could have a positive impact on COVID-19 outcome.

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Corresponding author: M. AbdAllah, National Research Centre, Dokki, Giza, Egypt.
E-mail: dr.mohamedabda@gmail.com

To the Editor,

Coronavirus disease-19 (COVID-19) is a highly contagious disease that is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which is a single-stranded RNA virus that was identified in China in December 2019 [1].

The disease has an asymptomatic or mild course in 80% of cases where fever, cough and sore throat are its most common presentations [2]. Host immunological response against SARS-CoV-2 can affect the disease outcome. Higher levels of interleukin-6, interleukin-10 and tumour necrosis factor- α are associated with poor outcome [3].

Micronutrients play an important role in the immune system and consequently could have a positive impact on COVID-19 outcome [4]. Antioxidants enhance natural killer cells and lymphocytic activity and increase interleukin-2 production [5]. Vitamin D is vital for the protection of the respiratory tract through its role in preserving tight junctions, killing enveloped viruses and inducing cathelicidin and defensins. It also reduces the risk of cytokine storm by decreasing the production of pro-inflammatory cytokines. However, poor sun exposure during hospitalization or home isolation may aggravate vitamin D deficiency [6]. Additionally, zinc has an inhibitory effect on the RNA-dependent RNA polymerase of SARS-CoV-2 by binding and elongation in Vero-E6 cells [7].

Based on these data, the nutritional state of individuals with COVID-19 may affect the progression and outcome of the illness. Despite the absence of any reports on malnutrition inside hospitals or in home isolation during the COVID-19 pandemic, conditions such as chewing problems, physical disabilities and cognitive disturbance may precipitate malnutrition [8].

According to the Egyptian guidelines for the management of COVID-19, daily supplementation of vitamin C (1 g) and zinc (50 mg) is mandatory for all symptomatic cases. Most patients receive these requirements through pharmaceuticals. As a consequence, drug shortages have been reported. Shifting to natural sources of these elements has become preferable to ensure delivery of the needed requirements each day.

The complementary medicine department of the National Research Centre has developed nutritional recommendations for natural micronutrient supplementation in individuals with COVID-19. These recommendations are based on the dietary supplement fact sheets of the US National Institutes of Health. Antioxidants and trace elements should be supplied in adequate amounts, as described in Table 1. Supplementation is described as daily value. This unit was developed by the US Food and Drug Administration to help consumers to compare the nutrients of food and dietary supplements.

Proper nutrition can also play a role in prophylaxis against COVID-19. Some reports recommend a Mediterranean diet

TABLE 1. Daily suggested amounts of micronutrients to be delivered to COVID-19 patients^a

Micronutrient	Recommended dietary allowances		Source	Micrograms per source unit	Daily value (%) ^b
	Male	Female			
Vitamin A	900 µg	700 µg	Beef liver, pan-fried, 85 g	6582	731
			Sweet potato, baked in skin, 117 g	1403	156
			Spinach, frozen, boiled, 125 g	573	64
			Carrots, raw, 125 g	459	51
Vitamin D	15 µg	15 µg	Salmon, cooked, 85 g	570	71
			Mushrooms, white, raw, sliced, exposed to UV light, 125 g	366	46
			Milk, 2% milk-fat, vitamin D fortified, 250 g	120	15
			Red pepper, sweet, raw, 125 g	95	106
Vitamin C	90 mg	75 mg	Orange juice, 187.5 g	93	103
			Orange, 88 g	70	78
			Oysters, cooked, breaded and fried, 85 g	74.0	673
Zinc	11 mg	8 mg	Beef chuck roast, braised, 85 g	7.0	64
			Crab, cooked, 85 g	6.5	59
			Beef liver, braised, 85 g	215	54
Folate	400 µg	400 µg	Spinach, boiled, 125 g	131	33
			Breakfast cereals, 50 g	100	25
			Rice, white, medium-grain, cooked, 125 g	90	22
			Almonds, dry roasted, 28 g	6.8	45
Vitamin E	11 mg	11 mg	Sunflower oil, 1 tablespoon	5.6	37
			Hazelnuts, dry roasted, 28 g	4.3	29

^aThese data are based on the US NIH dietary supplement fact sheet (available from: <https://www.federalregister.gov/documents/2017/10/02/2017-21019/food-labeling-revision-of-the-nutrition-and-supplement-facts-labels-and-serving-sizes-of-foods-that>).

^bDaily value (%) describes the ability of a certain amount and type of food to satisfy the recommended daily dietary allowance to satisfy the daily needs of a nutrient. Foods providing 20% or more of the daily value are considered to be high sources of a nutrient.

plan as the most suitable pattern to be followed in quarantine [5,9]. Unfortunately, however, lockdown and the other community preventive measures may affect people's diet plans. Boredom and stress may lead to large caloric intake, mainly carbohydrates. Carbohydrates enhance serotonin production, which aids in stress relief; natural sources such as bananas, cherries and oats may be healthier alternatives [5]. More studies are needed to improve nutritional plans as a complementary factor for both prophylaxis and treatment of COVID-19.

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Conflict of interest

The authors declare that there are no conflicts of interest in relation to this article.

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