

Enhancing Immunity and Nutrition: A Vital Topic in Novel COVID-19 Era under Quarantine

Rokayya Sami¹, Fuguo Jia¹, Yang Li¹, and Manal Mused Almatrafi²

¹Northeast Agricultural University

²Taif University College of Science

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Abstract

Coronavirus (COVID-19), as a respiratory disease, has become a serious globally issue (December 2019), China. There is a strong immunenutrition relationship with the respiratory viruses as coronavirus. Moreover, a decline in the immunity function is regularly inevitable with poor micronutrient, inflammation and the declining (T cell) function. Nutrition weapon can be one of the main factors for immune response activation. Therefore, there is a globally necessary need to join hands for human survival. This report focuses on the recommendations for maintaining an efficient immune system during quarantine are; getting balanced healthy food, supplements and planning meal times accompanied by light sports for immune cell triggering and functional expression against coronavirus.

Introduction

The World Health Organization had announced (COVID-19) as a pandemic on 11 March 2020[1]. The epidemic evolves and spreads resulting in highly rates of infection or even death. While the vaccine is absent, there is an essential need to mention the immune system, nutrition and how could we enhance ourselves against viral deadly infections especially among vulnerable patients as persons aged more than 65 years, with worthily health conditions (asthma, heart, chronic disease, or even immunosuppressed). COVID-19 may be transferred either by directly with infected patients or indirectly contact with surfaces used by the infected patients[2]. COVID-19 can cause a cytokine storm, which includes serious burst in the inflammatory ([IL]-6, IL-1 β , (TNF)- α) (IFN)- γ [3]. Undoubtedly, healthy diet, specific nutrients and nutrient facts can be effective with respect to disease vulnerability and immune responses by gene expression, cells activation, molecules production and gut microbial discourages[4].

Adjuration protection procedures under quarantine, self-isolation and sterilization are recommended for protection of COVID-19 infections.

Since being under quarantine, people seek for boredom and fear; due to the unemployment and news tragedy by social media platforms. This might result in poor diet quality and mood negative effect. Moreover, the unhealthy diet could increase inflammation, obesity, diabetes, cancer, lung problems and even the risks for more serious diseases than CoVID-19[5].

As a consequence, it is deemed crucial to consume serotonin and synthesis food sources such as almond, banana, oat and cherry to get rid of quarantine stresses[6]. In addition, tryptophan sources can act as sleep-inducing, neuropeptide Y inhibition, killer cell activity generator and respiratory infections control[7]. Furthermore, dairies, specially skimmed yogurt is strongly recommended for its highly useful microorganisms to ameliorate immunity system strengthens[8]. During quarantine, the nutritional deficiencies of macronutrients and micronutrients intake indeed resulted in depression of the immune function as secretory antibody, phagocyte, cytokine production eventually, increase the susceptibility for viral infections as COVID-19[9].

(Fig. 1) Shows the nutrients intake for novel Covid-19 Era effect on functions related and virus targeted under quarantine. Vegetables, salads and fruits regularly intake can supply micronutrients as vitamin (A, B, C, D, E), minerals (Zn, Se, Cu, Fe, Ca) and phytochemicals (rutin, hesperidin) to clean the body and boost the immune function[10].

Additionally, antioxidants food sources can increase (T-cell subsets), interleukin-2, lymphocyte reaction against the mitogen and even the activity of natural killer cell (NK cells)[11]. There are a lot of nutritional supplements to motivate the immune system due to its bioactive ingredients such as bee pollen, echinacea, mulone syrup, thyme and (nigella sativ, cod liver, pumpkin seed, fennel) oils[12]. It is necessary to reduce sugars intake as they reduce white blood cells function against microbes[13]. Admittedly, smoking is forbidden due to the free radical, nicotine and nitrogen dioxide ozone productions, which in turn weakens immunity[14].

The current article focuses on the immunenutrition relationship with the respiratory viruses as coronavirus. Definitely there are numerous nutritional date of enhancing the complex immune system needs, in synergy or individually such as diet, fruit, herbs, vitamins, nutraceuticals, antioxidants, trace elements and probiotics with the help of light sports against respiratory infections and pneumonia as COVID-19 syndromes.

Essential Nutrients for Healthy Respiratory System

Vitamin A

“Anti-infective” is a common name due to its enormous functions against measles-related pneumonia, human immunodeficiency virus (HIV), lung diseases and bronchitis virus[15]. Retinol plays a basic function in the immune system due to the angiotensin enzyme, which is essentially needed for SARS/COV-2 body entry[16].

Vitamin B group

Vitamin B group is famous for its individual function. Riboflavin is essential for cell energy metabolisms against (MERS-CoV)[17]. Niacin can kill *Staphylococcus aureus* and inhibit the neutrophil infiltration with a physically powerful anti-inflammatory activity in ventilator-induced lung injury[18]. Pyridoxine is well known for the immune system due to the protein metabolism function[19]. Folic acid can enhance the immune system by white blood cell production that acts as soldiers for body defiance. Cobalamin remains the ratio (CD^{4+}/CD^{8+}) balances and facilitates (T-lymphocytes cells) production in a normal range[20]. Consequently, the Vitamin B group might be used as COVID-19 treatment.

Vitamin C

Vitamin C is beneficial in pneumonia treatment, cellular functions, collagen synthesis in connective tissues, immune support against pathogens and oxidative stress[21]. Vitamin C is well-known as an antioxidant that can offset oxidative stress effects by reducing antioxidant enzymes and consequently oxidative damage increase[22]. Vitamin C may act as a weak antihistamine agent to aid COVID-19 syndromes such as running nose, swollen sinuses and sneezing, which is highly found in several fruits and vegetables like oranges, broccoli and blackcurrants.

Vitamin D

Vitamin D acts as a hormone, that may be synthesized by the sunlight through the body to enhance immune cells and maintain bone integrity[23]. Vitamin D is considered as a safe strategy to protect from respiratory viruses and increase the antiviral defenses. vitamin D low levels may modulate the expression as (chemokines, interferon, tumor necrosis and proinflammatory cytokines). COVID-19 infected patients almost might have an unsatisfactory vitamin D level. As a result, vitamin D might act as an additional beneficial choice for coronavirus treatment by getting (10 µg) as a supplement daily[24].

Vitamin E

Vitamin E acts as an antioxidant against free radicals to reduce oxidative stresses. Vitamin E lower intake can cause of coxsackievirus B3 myocardial injury infection and bovine coronavirus in mice and calves, respec-

tively[25]. In addition, vitamin E supplements induce effective thymic atrophy early recovery of especially [?] 60 years[26].

Zinc

Zinc is involved in preventing pneumonia, inflammatory responses, immune system (adaptive and innate cells) and pathogen-eliminating[27]. Moreover, the low concentrations intake of pyrithione and zinc can inhibit (SARS-CoV) and torquetenovirus (TTV)[28]. As a result, zinc supplements as UL of 25 mg/day and naturally crab, shrimps, eggs and adzuki beans can control coronavirus (COVID-19) symptoms.

Selenium

Selenium is well known due to the functions of selenoproteins as an antioxidant defense for cell signaling as (CAT, SOD, GSH, ROS) and redox homeostasis[29]. Glutathione peroxidase is famous for reducing lipid peroxides and hydrogen, thioredoxin reductase for the thiol systems homeostasis. ROS are generated against (HIV) for the immunity system, (RSV) for the respiratory system and flu viruses 30]. Selenium low intake level can weaken the immune system, on the other hand rapid RNA mutations from benign variants to virulence. Ginseng bioactive component extract had used successfully for bronchitis coronavirus. As a result selenium supplementation can be used for COVID-19 treatment[31].

Copper

Copper is essential for the metalloenzyme control like superoxide dismutase, which has a vital function in the immunity system as (T and B) lymphocyte responses. Copper supplementation regular intake for eight weeks established suppressed mitogen-induced lymphoproliferative response[32].

Iron

Iron salts are required for enhancing immunity like iron lactoferrin and catalase. Respiratory infections, anemia and diarrheal are obvious syndromes for iron deficiency[33].

Calcium

Calcium works mainly on lymphocytes, which helps lymphocytes to maintain (Ca^{2+}) as low levels. In addition, vitamin D and calcium cooperation can affect on several types of immune cells like antigen-presenting, (T) and (B) cells to adjust both adaptive and innate immune responses, that may extend further than calcium and bone homeostasis.[34].

Therefore, vitamins and minerals as principal nutrients for immunonutrition might be useful for COVID-19 prevention.

Declaration of Competing Interest

There are no conflicts to declare

FIGURE CAPTION:

Fig. 1 Nutrients intake for novel Covid-19 Era effect on functions related and virus targeted under quarantine.

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