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Review Article

Suggestions on Food and Lifestyle for Fighting Corona Virus by Boosting Immunity - A Holistic Approach

Aparna Kuna[1] and Prabhat Kumar Mandal[2]*

[1]MFPI-Quality Control Laboratory, Professor Jayashankar Telangana State Agricultural University, Rajendranagar, Hyderabad, India

[2]Department of Livestock Products Technology, Rajiv Gandhi Institute of Veterinary Education and Research, Pondicherry, India

***Corresponding Author:** Prabhat Kumar Mandal, Department of Livestock Products Technology, Rajiv Gandhi Institute of Veterinary Education and Research, Pondicherry, India.

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Abstract

The world is going through a most critical threat now due to the Corona Virus Disease, 2019 (COVID 19). Here is the summery of the preventive holistic approach for boosting immunity and fight the disease better from inside. Here we propose following suggestions for reducing the chances of infection or to reduce the severity if infected:

1. Take protein rich foods (Meat chicken, fish, eggs, milk and milk products any kind of pulses, beans and nuts) daily.
2. Take any available fruits daily, especially citrus fruits (gooseberry, lemon, sweet lime, orange, pineapple), apple, pomegranate, banana etc.
3. Take herbs and spices (turmeric, ginger, garlic, cardamom, cinnamon, tulasi) especially black jeera (Kalonji), is very effective for Corona.
4. Fruits and herbs can be taken as raw, juice, extract or dry as available. If not available take supplements, Vitamin-C, E (Evion), B Complex (Becosules, Cobadex CZS), Zincovit etc.
5. Eat more vegetables, especially salads (tomato, cucumber, carrot, capsicum, radish, onion), honey, avoid smoking and Alcohol.
6. Daily Exercise, Yoga, Pranayam (Bhrastika, Anulom-Vilom, Kapalbhati) Meditation, Chanting (Mahamrityunjay Mantra) will improve immunity.
7. Walk in sunlight and fresh air (in Terrace or Balcony during lockdown) daily morning and evening is very helpful for immunity
8. Relax, take enough Rest and Sleep that will boost immunity. Take only essential updates, too much informations in social media may cause anxiety.
9. Drink more tea (Chinese Doctors reported very good effect of tea on the corona patients), more water (warm), enough coconut water and citrus juice if infected.
10. Finally, don't panic, fear and anxiety reduces immunity, be mentally strong and positive, pray with Full faith or rely on Nature to boost immunity and fight Corona

Keywords: Food; Lifestyle; Corona Virus

Introduction

The coronavirus pandemic has turned the world's attention to the immune system, the body's defence force against disease-causing bacteria, viruses and other organisms that we touch, ingest and inhale every day. Viral interactions with the innate immune system play a central role in determining the outcome and intensity of any kind of infection [1]. Corona viruses are common respiratory and enteric pathogens of a variety of birds and mammals, including man. About 15% of common colds in man are caused by coronaviruses [2]. Many research studies reinforce the hypothesis that effective host immunity can reduce the susceptibility to repeated infections and also reduce the co-morbid conditions. This review is a compilation of various foods and nutrients that have a positive effect on boosting the immune system. Consumption of these foods do have a very good improvement in the immunity status of an individual, which in turn can be beneficial in reducing the intensity of the virus infection and also might help in faster recovery.

A well-functioning immune system is critical for survival, which includes the role of macronutrients, and the gut microbiome in mediating immunological effects. Nutritional modulation of the immune system has applications within the clinical setting, but can also have a role in healthy populations, acting to reduce or delay the onset of immune-mediated chronic diseases [3].

Nutrition and immunity

Nutrition is a critical determinant of health. For a variety of reasons, many Indian individuals tend to have a high prevalence of nutrient deficiencies. Based on surveys conducted in India, Europe, USA and Canada, it has been estimated that as many as 35% of people who are 50 year of age or above have a demonstrable deficiency of one or more vitamins and trace-elements. In most instances, it is not possible to diagnose the nutritional deficiency by clinical history and examination. Nevertheless, such subclinical deficiency may have significant physiological effects such as those on the immune system. The clinical outcome of impaired immunity is an increased incidence of common infections affecting the upper and lower respiratory, urinary and genital tracts.

Recent observations on nutrition-immunity interactions has opened up exciting possibilities for nutritional intervention for both primary and secondary prevention of infection in high-risk groups. Several investigations have highlighted the value of nutrient-enriched diets in improving immune responses and survival following challenges with organisms like bacteria, viruses etc. The results of a few recent intervention trials indicate that modest supplements of micronutrients improve immune responses and more significantly, reduce the incidence of respiratory infection and antibiotic usage.

Energy and protein

Adequate and appropriate nutrition is required for all cells to function optimally and this includes the cells in the immune system. An "activated" immune system further increases the demand for energy during periods of infection, with greater basal energy expenditure. Hence, optimal nutrition for the best immunological outcomes would be nutrition, which supports the functions of immune cells allowing them to initiate effective responses against pathogens but also to resolve the response rapidly when necessary and to avoid any underlying chronic inflammation. The immune system's demands for energy and nutrients can be met from exogenous sources i.e. the diet, or if dietary sources are inadequate, from endogenous sources such as body stores. Consumption of sufficient amounts of energy and protein from whole cereals, millets and proteins (plant or animal proteins) is essential for ensuring successful proliferative response within the immune system. Foods rich in proteins, especially amino acids like arginine and glutamine is essential for the generation of immune cells including neutrophils, macrophages, and lymphocytes [3,4].

Vitamin D

The vitamin D receptor (VDR) is a nuclear receptor that can directly affect gene expression [3,5]. The presence of VDR in the majority of immune cells immediately suggests an important role for this micronutrient in immune cell activities [6]. Furthermore, vitamin D-activating enzyme 1-α-hydroxylase (CYP27B1), which results in the active metabolite 1α,25-dihydroxy vitamin D3 (1,25(OH)2D3), is expressed in many types of immune cells. Ligation of VDR by 1,25(OH)2D3 can elicit the production of antimicrobial proteins and influence cytokine production by immune cells [6,7]. Sassi., *et al*. [8] reviewed the evidence for the role of the nutrient vitamin D in the innate and adaptive immune systems. Hence, exposure to sunlight at least for an hour or two daily is very important to ensure the required amount of Vitamin D.

Probiotics

Few living micro-organisms like *Lactobacilli* and *Bifidobacteria* consumed through foods like yoghurt, fermented vegetables or meats, when ingested in certain amounts, have a positive impact on host health, which goes beyond conventional nutritional effects [9].

Consumption of *Lactobacillus acidophilus* and *Bifidobacterium bifidum* showed an improvement of the non-specific immune phagocytic activity of granulocytes, involved with natural immunity in the blood of human volunteers [10,11]. Ingestion of yoghurt has been reported to stimulate cytokine production by monocytes, including interferon g (IFN-g) in human blood mononuclear cells [12,13].

Prebiotics

Ingredients like fibre, fructo-oligosaccharides, inulin, lactulose, sugar alcohols have a beneficial effect on the gut microflora, by production of short-chain carbohydrates, which in turn ferment in the large bowel and stimulate the growth of potentially beneficial *Bifidobacteria* [14]. Consumption of Synbiotics (a mixture of prebiotics and probiotics) also have beneficial effects on the immune system [13]. Prebiotic rich foods are onions, garlic, whole cereals, millets and legumes.

Micronutrients

Many studies have pointed out that micronutrients such as selenium, zinc vitamins A, C and E can influence several components of the immune system [15]. Many of these micronutrients are included in natural foods like green leafy vegetables, fruits, other vegetables and whole grains and millets, apart from few fortified processed foods like breakfast cereals, juices, dairy products, etc. Consumption of these nutrient have an important role in the prevention of disease and promotion of health. Single nutrients such as vitamin B6, zinc and low-dose vitamin E also have an important effect on health indicators through improved immune response

Dietary antioxidants

The immune system is highly reliant on accurate cell to cell communication for optimal function, and any damage to the signalling systems involved will result in an impaired immune responsiveness. Oxidant mediated tissue injury is a particular hazard to the immune system, since phagocyte cells produce reactive oxygen species as part of the body's defence against infection. Adequate amounts of neutralizing antioxidants are required, therefore, to prevent damage to the immune cells themselves. Many antioxidants can be obtained directly from the diet by consuming coloured foods like fruits, vegetables, greens, whole grains. Numerous epidemiological studies have found strong associations between diets rich in antioxidant nutrients and a boost to the body's immune system [16].

Tea

The medicinal effects of tea have a history dating back almost 5000 years. The chemical components of green tea includes polyphenols, flavonoids, caffeine and amino acids, due to which tea is reported to have anti-oxidant properties and beneficial effects. Consumption of tea may reduce inflammation, have antimicrobial and diuretic effects due to flavonoids and caffeine. Another compound in tea is theophylline, which has scientific proof in the treatment of respiratory diseases such as asthma [17]. Green and yellow tea-fortified cookies had considerably higher contents of dietary fiber, especially hemicellulose and insoluble fractions, and were characterized by significantly higher antioxidant potential associated with their phenolics content. Significantly higher antioxidant potential of tea cookies was observed in terms of the inhibition of hydroperoxide content [18]. Tea leaves could be widely used as a source of polyphenols with high antioxidative potential, as well as fibre; thus introducing numerous health benefits for the consumer.

Mind-body therapies, including yoga, Tai Chi, Qigong and meditation

The use of mind-body therapies, including Tai Chi, Qigong, yoga and meditation, has grown steadily in recent years. These approaches have been shown to be effective in reducing symptoms and improving quality of life. Research has begun to examine the impact of these therapies on biological processes, including inflammation. A review of 26 randomized controlled trials was conducted to describe the effects of mind-body therapies (MBTs) on circulating, cellular, and genomic markers of inflammation. This qualitative evaluation showed mixed effects of MBTs on circulating inflammatory markers, including CRP and IL-6, and on measures of stimulated cytokine production. More consistent findings were seen for genomic markers, with trials showing decreased expression of inflammation-related genes and reduced signaling through the proinflammatory transcription factor NF-κB, leading to alterations in neuroendocrine, neural, and psychological and behavioral processes [19].

Review and meta-analysis publications on yoga, including demographics/prevalence of yoga as a practice, bibliometric analyses of yoga publications and use of yoga for physical fitness and cognitive function have shown to have effects on psychiatric and medical conditions (pregnancy, prenatal and postpartum depression; stress, PTSD, anxiety and obesity; cardiovascular condi-

tions including hypertension; pain syndromes including arthritis, headaches and low back pain; autoimmune conditions including asthma, type II diabetes and multiple sclerosis; immune conditions including HIV and breast cancer; and aging problems including balance, osteoporosis and Parkinson's). Yoga has been more effective than control and wait list control conditions, although not always more effective than treatment comparison groups such as other forms of exercise, and most of the studies highlight the therapeutic effects of yoga [20]. Spending at least 30 minutes per day for mind and body therapies might have a positive effect on the immune system.

Sleep

It is revealed that human immune system and sleep both are associated and influenced by each other. Sleep deprivation makes a living body susceptible to many infectious agents. In the result, immune system of human body is altered by releasing immunomodulators in the response of infections as reported by various researchers. Basic reasons and mechanisms of most of the poor sleep networks and release of proinflammatory modulators are still uncertain [21]. Our capacity to remain healthy is badly effected by loss of sleep and sense of comfort, physiological framework accompanied by health is badly influenced by poor sleep [22]. Our demand for sleep is also increased in most of the ailments as observed [23]. Perceptivity to infectious diseases and deterioration of systemic circulation of leukocytes is increased by petty alterations due to lack of sleep [24]. However, there is a huge complexity in both the immune system and sleep [25,26]. The current situation requires improved sleep habits to make immune system efficient for a healthy life.

Conclusion

Summary of the preventive holistic approach for boosting immunity and fight the disease better from inside.

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