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Review Article

Healthy Nutrition and Immunity: The Correlation Between them for Covid-19 Patients

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Abstract

The COVID-19 pandemic has hit the world with unanticipated losses. Caused by a string of corona virus (Sars-Cov-2), the condition has had drastic effects. Many peoplehave died, lost loved ones, lost jobs, lost businesses, and lost properties. Immunity helps humans fight against pathogens, and a balanced diet has been promoted as the key means of boosting immunity. More so, certain nutrients such as vitamins and mineralsare directly linked to promoting the immune system and particularly facilitating the production of antibodies to fight against specific pathogens, bacteria, or viruses. Sincethe onset of the Covid-19 pandemic, the promotion of healthy nutrition has been promoted to help the body fight the virus. There has also been an increase inthe promotion of certain nutrients such as vitamins A, C, and D, and trace elements like zinc and iron supplements. These enable the immunity to function more effectively, fighting off COVID-19, and developing hybrid immunity which protects survivors even better when vaccinated. Therefore, this paper explores the association between healthynutrition and Covid -19 to explain the emphasis on healthy nutrition in the pandemic era and clarify any misconception of supplements while promoting effective nutrition to help fight the virus.

Keywords: Immunity; COVID-19; Pandemic; Healthy food

Introduction

Healthy Nutrition has been vastly advanced to promote immunity in Covid- 19 patients. Following public health recommendations on Nutrition to boost immunityto fight against covid-19, the internet's information-seeking behavior increases nutritional terms search on Google [1]. Since its start in 2019 and being declared by the World Health Organization as a pandemic in March 2020, the virus has caused havoc worldwide [2]. WHO breaks down the nutritional guide for grown-ups to help fight against Covid-19 infection, including consumption of fresh-unprocessed foods daily, moderate amounts of oils and fats, consumption of 8-10 cups of water daily, avoiding eating out, consuming less salt and sugar, and seeking help for dietary needs especially for people with chronic illnesses with Covid-19 or seeking to avoid contracting the infection [3].

Nutrients for Covid-19 Immunity

Immunity in the human system helps fight pathogens, and Nutrition is an important factor that promotes immune response. Immunity is the body's ability to protect an individual from getting sick when exposed to a disease-causing agent [4]. The agents could be a bacterium, parasite, virus, or fungus [5]. Strong immunity is based on a continuous consumption of a balanced diet and not justa one-day activity. According to Harbige, et al. many people lack acquired immunity worldwide. This could be bolstered through increased intakes of antioxidants [6]. The primary role of the immune system is to protect the body against infection and fight infections. While it is always at work, the immune system becomes more aggressive when infected [7]. The increased activity means increased metabolism. There is more need for energy and substrates for molecule regulation and biosynthesiswith increased metabolism. Vitamins D, C, and E, and trace elements like iron, selenium, and Zinc, are significant in boosting the immune system and ensuring it is properly functional. These elements are all found in proper diets, and thus nutrition is key in bolstering immunity [8].

Good Nutrition is the key to the effectiveness of promoting immunity. However, age may come with impairments in immunity which makes older people or malnourished persons more vulnerable

to infections, thus the higher risk for Covid-19among older people. Therefore, more nutrients such as vitamin C that directly help decrease the SARS-CoV-2 infection severity are recommended for those with compromised immunity [7]. The human immune system stays active, but an infection's presence facilitates action. There is a higher metabolic rate with an infection, demanding more energy sources. Vitamins and minerals have a key role in boosting immunity and minimizing infection risk, with selenium and Zinc being more effective for antiviral defense [9]. The findings are seconded by Jayawardena et al., who find that Zinc and selenium modulate the immune systems in ways that favorably enhance response to viral infections [10]. Also,Probiotics and nutraceuticals improve immune systems, especially in people with compromised nutrition status, such as chronically ill or the elderly [10].

The association between immunity, Nutrition, and Covid-19 is complex and reciprocal. Nutrition affects immunity which then affects the response to Covid-19. Nutritional-related disorders such as obesity probably carry a malnutrition component on a micro or a macronutrient such as Vitamin C, which undermines immune responses and risk high disease severity. Therefore, the management of Covid-19 needs to regard nutritional status across various factors such as gut signs and symptoms. Macro and micronutrients and body weight [8]. Vegetables, coffee, and childhood breastfeeding are linked positively to covid-19 management, while the meat was linked to the adverse impact of covid-19 risk or severity [11].

Also, most vitamins are advanced for boosting immunity, including vitamin D, but other studies refute the efficacy of vitamin D, citing that it is linked to higher Covid-19 incidence and severity [12]. On the other side, Covid-19 affects the digestive systems and foodintake. Loss of taste associated with Covid-19 may hinder the need for the pleasureassociated with eating food and limit nutrient intake [13]. Mrityunjya, et al. identify nutrients that offer anti-swelling on antioxidant effects and boost immunity [14]. The identified nutrients include Zinc, Vitamin C & D, probiotics, quercetin, curcumin, and selenium. They propose that developing supplements that combinations of nutrients can boost the immune system to fight Covid-19 while suppressing any swelling associated with the infection [14].The provisions are reiterated by Chaari et al., who stresses that Nutrition with the right nutrients, including vitamins, magnesium, zinc, iodine, and selenium, offers anti-inflammatory antioxidation effects [15]. The author's stress that nutritional reinforcement should be applied before infection reduce severity when and if infected, boost immune response during infection and promote resilience to reinfection after infection [15].

Markedly, there is no specific evidence that Nutrition protects or reduces the severity of Covid-19 because there has not been a specific study on the association. However, itmakes sense to promote Nutrition in the fight against Covid-19 based on nutrition and immunity response to infections [6]. The general medical and health advice is that people should consume well-balanced foods with vegetables and fruits to promote antioxidants and related nutrients, which boost immunity. Elderly and other vulnerable populations are specifically advised to consume more vitamin C, E, D, Zinc, which promote T and B antibody cells [6]. Deschasaux-Tanguay, et al. agree by promoting that nutritional intake should comprise high vegetable and fruit content, which ensures a higher supply of vitamin C & K, folates, and fiber to reduce vulnerability to Coronavirus [16].

Quality nutritional status is linked to resilience againstCovid-19 by strengthening the immune system. Vitamin C is specifically linked to improving the immune system. Atthe same time, a proper diet with optimal nutrients based on individual factors is commended for placing the body in a better state to fight the virus [17]. A deficiency in any one nutrient can get linked to compromised immunity and a higher risk of contracting an infection in severe forms [18]. Moreover, optimal nutritional status is maintained by taking a balanced diet andhigher content of the critical nutrients consistently with frequency on meal consumption, hydration, and physical exercises to moderate immune response [19].

Nutrition and T and B Cells Antibodies in Covid-19

To understand how long one's immunity can last against COVID-19, Baraniuk studied the response rates of the T and B cells when fighting infections. These are the primary cells in disease-fighting in the human body [20]. Some last for years and are readyto fight when their target pathogen is reintroduced in the body. They are responsible for establishing long-term immunity for those who have recovered from a particular infection. The study established that T and B cells lasted up to 8 months in COVID-19 recovered patients. The natural immunity they gain is effective for up to 8 months.

According to Reynolds, more than 95% of those who recovered from COVID-19 gained this natural immunity [21,22]. It is important to note that those who recovered had stronger immune systems due to their balanced nutritionstatus. The recovery gave them even further protection as they became more assertive against the virus.

T cells and B cells antibodies play a primary role in fighting disease and their production. CD8+T cells play a direct role in attacking and killing cells affected by the virus, whereas CD4+T cells are integral to promoting the production of T and B cells. Ciovid-19 patients have shown an increased level of T cells in the lungs, supporting the idea that T cells move and develop in the affected region to promote immune responses [23]. Notably, the promotion of B cells is a key aim of vaccination as research

has shown that super immunity in Covid-19 cases develops after infection or with the vaccination. The scientific approximation is that the immune system recalls the Covid-19 pathogen for as long as eight months after infection, allowing favorable immune responses if the pathogens are encountered again[21]. Antibodies formed after infection are mostly short-lived; thus, antibody cells decline when the causative plasma blasts die off. After the death of the short-lived antibodies, memory B cells are the source of antibodies, which are rarer, provoked by vaccination or infection, are long-lived, thus the suggested resistance to covid-19 infection after initial infection [5].

Whether or not one has had Covid-19 infection, vaccination boosts the number of antibodies such as B cell antibodies that enhance the immune response to Covid pathogens. Some propose that the vaccines can induce a higher volume of the T and Bcells antibodies and is crucial for people with compromised natural immunity [12]. However, other opinions state that there is no certainty on why immunity is longer lasting than the other between naturally developed immunity following infection and vaccination. There is agreement that both promote lasting immunity for at least six months. Those who suffer severe Covid-19 gather morememory antibodies, thus likely to acquire immunity that likely lasts longer [20].

Nutrition and immunity are also highlighted in the hybrid immunity experienced when COVID-19 vaccines were disseminated. It was observed that people who had been previously infected and recovered from the virus developed a hybrid immunity when vaccinated [23]. Their serum was more developed to detect and neutralize immune-evading strains like the new COVID-19 variants. This is important in keepingeveryone safe, and nutrition is key. Most of those recovering have strong immunities and consume balanced diets [24]. This enables their bodies to fight against the pathogens and come out successful, developing hybrid immunity when vaccinated [5]. With a poor diet and immune response, one would quickly succumb to first-time infection, as seen with older people [5]. Thus, they can no longer develop hybrid immunity as they would probably die from the first infection.

In the wake of the virus, many people realized the importance of proper diets. This is evidenced by skyrocketing numbers of online searches for nutritional immunity [1]. It shows people know they need to be healthy to fight off diseases. The World Health Organization also developed a diet regime for adults to ensure a strong immune system. According to WHO, eating a well-balanced diet significantly improves one's ability to fight off chronic and infectious diseases. They advocate for people to avoid processed sugary, salty, and oily foods that increase one's susceptibility to diabetes, obesity, and heart disease [25]. These conditions weaken the immune system, making the victims more prone to severe COVID-19 effects. Instead, WHO encourages the consumption of fresh fruits, nuts, raw vegetables as snacks, whole grains, and foods from animal sources like milk, eggs, and meat [25]. Diet and nutrition play a significant role in immunity performance and thus must be taken seriously [26]. In any case, The Nutrition Society warns that immune responses are a complex feature that involves many mechanisms, not just diet [26]. The immune system is also affected by age, physical fitness, genetics, infection history, vaccination, gut microbiomes, and other factors. However, diet plays a major role in ensuring the body is strong enough to withstand infections. Hence, it should notbe assumed.

Emphasis on Vitamin C and Zinc

There have been increasing claims of Vitamin C and zinc supplements being very effective in helping with Covid-19. However, experts have addressed the misconceptions by explaining that immunity is complex and not a result of one factor or select nutrients but rather a vast range of nutrients. The experts thus promote an optimal diet with more food rich in minerals and vitamins and animal products for B12 and fatty acids. They also promote high-fiber foods to aid with microbiome variety for the gut to boost immunity [26]. However, it is proven that specific nutrients have higher efficacy in promoting immunity, especially for at- risk populations; Vitamin C, D, and Zinc supplements have proven efficacy in managing respiratory infection such as pneumonia and can have a similar effect in Covid-19 [27]. The provision for higher effectiveness with minerals and vitamins in promoting immunity against Covid-19 is also promoted and advanced for good performance of the immune system [28]. On the contrary, Singh et al. negatively associate Zinc with Covid-19, linking it to higher mortality and incidence, suggesting that Zinc is not protective in managing covid-19 [29].

Conclusion

In summary, healthy Nutrition is crucial in boosting immunity to promote a strong immune response to Covid-19 infections. As a result, patients are protected from contracting the virus, or the severity of the attack by the virus is reduced significantly. A balanced diet incorporating all nutrients appropriately is key to an immune boost. However, Vitamins, minerals, and probiotics play a more significant role by influencing antibody productions for viral infections, thus promoting vitamins C and Zinc supplements in light of Covid-19. The larger literature shows that nutrients such as vitamins and minerals play a primary role in immunity boost, thus preventing and protecting Covid-19 patients. The immune system is central to the body's ability to avoid infections or fight infections. It also affects the severity and the time taken to recover from the disease. Proper nutrition is a sure way of bolstering one's immunity as the body acquires the necessary nutrients like Vitamin A, C, and D, and minerals like iron and Zinc that are significant in the proper functioning

of the immune system. Nutritional inadequacies cause immune impairments, leading to increased susceptibility to COVID-19. It also allows the infections to be severe in the body or even fatal. Thus, proper diets are essential in maintaining a healthy lifestyle, with a strong immune system that reduces the risk of COVID-19 infection and the risk of succumbing to COVID-19.

References

1. Kushwaha S, Khanna P, Jain R, Srivastava R (2021) Determining the nutritional immunity information-seeking behaviour during the COVID-19 pandemic in India: a Google Trends data analysis. Public Health Nutr 24: 5338-5349.
2. Cucinotta D, Vanelli M (2020) WHO Declares COVID-19 a Pandemic. Acta Biomed 91: 157-160.
3. World Health Organization (2020) Nutrition advise for adults during the Covid-19 outbreak.
4. Johns Hopkins Medicine (2021) COVID Natural Immunity: What You Need to Know.
5. Callaway E (2021) COVID super-immunity: one of the pandemic's great puzzles. Nature 598: 393-394.
6. Harbige L, Calder P, Marcos A, Dardenne M, Perdigón G, et al. (2020) ISIN position statement on Nutrition, immunity, and COVID-19. International Society for Immunonutrition (ISIN).
7. Calder PC (2021) Nutrition and immunity: lessons for COVID-19. Nutr Diabetes 11: 19.
8. Bold J, Harris M, Fellows L, Chouchane M (2020) Nutrition, the digestive system, and immunity in COVID-19 infection. Gastroenterol Hepatol Bed Bench 13: 331-340.
9. Calder PC (2020) Nutrition, immunity, and COVID-19. BMJ Nutr Prev Health 3: 74-92.
10. Jayawardena R, Sooriyaarachchi P, Chourdakis M, Jeewandara C, Ranasinghe P (2020) Enhancing immunity in viral infections, with special emphasis on COVID-19: A review. Diabetes Metab Syndr 14: 367-382.
11. Vu THT, Rydland KJ, Achenbach CJ, Van Horn L, Cornelis MC (2021) Dietary Behaviors and Incident COVID-19 in the UK Biobank. Nutrients 13: 2114.
12. Lordan R, Rando HM. Greene CS (2021) Dietary Supplements and Nutraceuticals Under Investigation for COVID-19 Prevention and Treatment. ArXiv: 2102.02250v1.
13. Alhusseini N, Alqahtani A (2020) COVID-19 pandemic's impact on eating habits in Saudi Arabia. J Public Health Res 9: 1868.
14. Mrityunjaya M, Pavithra V, Neelam R, Janhavi P, Halami PM, et al. (2020) Immune-boosting, antioxidant, and anti-inflammatory food supplements targeting pathogenesis of COVID-19. Front Immunol 11: 570122.
15. Chaari A, Bendriss G, Zakaria D, McVeigh C (2020) Importance of dietary changes during the coronavirus pandemic: how to upgrade your immune response. Front Public Health 8: 476.
16. Deschasaux-Tanguy M, Srour B, Bourhis L, Arnault N, Druesne-Pecollo N, et al. (2021) Nutritional risk factors for SARS-CoV-2 infection: a prospective study within the NutriNet-Santé cohort. BMC Medicine 19: 1-18.
17. Aman F, Masood S (2020) How Nutrition can help to fight against COVID-19 Pandemic. Pak J Med Sci 36: S121-S123.
18. Alam S, Bhuiyan FR, Emon TH, Hasan M (2021) Prospects of nutritional interventions in the care of COVID-19 patients. Heliyon 7: e06285.
19. Jain S, Ranjan S (2020) Evidence that maintaining optimal Nutrition for a well- functioning immune system might promote recovery for mild COVID-19 patients. World Nutrition 11: 66-93.
20. Baraniuk C (2021) How long does covid-19 immunity last? BMJ 373: n1605.
21. Reynolds R (2021) Lasting immunity found after recovery from COVID-19. National Institutes of Health, U.S. Department of Health and Human Services.
22. Maragakis L, Kelen DG (2021) COVID Natural Immunity: What You Need to Know. John Hopkins Medicine.
23. Tay MZ, Poh CM, Rénia L, MacAry PA, Ng LF (2020) The trinity of COVID-19: immunity, inflammation, and intervention. Nat Rev Immunol 20: 363-374.
24. WHO (2020) Coronavirus Disease (COVID-19) - Events as They Happen.
25. WHO (2021b) WHO EMRO | Nutrition advice for adults during the COVID-19 outbreak | COVID-19 | Nutrition site.
26. The Nutritional Society (2020) Nutrition, Immunity, and COVID-19.
27. Derbyshire E, Delange J (2020) COVID-19: is there a role for immunonutrition, particularly in the over 65s? BMJ Nutr Prev Health 3: 100-105
28. Kumar P, Kumar M, Bedi O, Gupta M, Kumar S, et al. (2021) Role of vitamins and minerals as immunity boosters in COVID-19. Inflammopharmacology 29: 1001-1016.
29. Singh S, Diwaker A, Singh BP, Singh RK (2021) Nutritional Immunity, Zinc Sufficiency, and COVID-19 Mortality in Socially Similar European Populations. Front Immunol 12: 699389.