

Role of Nutrition and Supplements in COVID-19-A Review

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Received: 26 Jun 2021/ Revised: 23 Aug 2021/ Accepted: 03 Oct 2021

ABSTRACT

At the end of 2019, a new coronavirus (COVID-19) appeared on the world stage, the Covid-19 pandemic is a major global challenge affecting mainly the respiratory system, causing pneumonitis and multi-organ failure and, although it starts with common symptoms such as shortness of breath, cough, cold and fever lead to death in about 2-3% of cases. Unfortunately, no specific cures have been found to date to cure this virus, so it is advisable to implement all possible strategies to prevent infection. The COVID-19 pandemic represents a massive impact on human health, causing sudden lifestyle changes, through social distancing and isolation in the home, with social and economic consequences. Improving public health during this pandemic requires knowledge not only of medical and biological sciences but also of all humanities related to lifestyle, social and behavioural studies, including eating habits and lifestyle. The intake of a complete dietary regimen, the use of dietary supplements, and other closer interventions show promise for the prevention, management, and recovery of COVID-19 patients. Dietary management recommendations, food safety suggestions, and healthy food practices are obligatory diet and supplementation in management as well as regaining from COVID-19.

Key-words: Acute respiratory tract infections, COVID-19, Dietary supplement, Health Immunity and Nutrition

INTRODUCTION

Acute respiratory tract infections (ARI) are a major factor in mortality and morbidity worldwide, as evidenced by the recent coronavirus disease 2019 (COVID-19) and seasonal flu epidemics. Globally, acute respiratory disease has been estimated to have caused an estimated 2.4 million deaths in people of all ages in 2016. COVID-19 is a respiratory disease caused by the novel coronavirus, SARS-CoV-2, which was declared a pandemic by WHO on March 11, 2020. Since then, several new variants of SARS-CoV-2 have emerged, 2 adding to the global burden of infection despite public health practices that include personal protective equipment (PPE), social distancing, and hand washing [1].

Carried out, during the pandemic period, the introduction of various countermeasures such as the long-term quarantine "lockdown" in cases of suspected or confirmed COVID-19, could generate the adoption of unhealthy eating patterns, increasing the risk of non-communicable diseases in the medium to long term [1].

More than 2500 years ago, Hippocrates said, "Let food be your medicine and medicine be your food." Both nutrient intake and illness incidence often affect the nutritive status, especially in developing nations, where everyone struggles for nutriment. Malnutrition and infectious diseases can show serious malnutrition [2]. Currently, the COVID-19 epidemic is the main challenge worldwide, so boffin and researchers are trying to create a specific vaccine for this specific virus, but so far they have not been successful. Even if they could discover the vaccination method, there is a high probability that other antimicrobial-resistant infections will prevail in the community somehow. Nutritional status is mandatory to maintain well immune system against the virus to increase life expectancy [3]. Patients with COVID-19 can progress the disease in several ways: they can be

How to cite this article

Saini I, Mali PC. Role of Nutrition and Supplements in COVID-19-A Review. SSR Inst. Int. J. Life Sci., 2021; 7(6S): 30S-35S.



Access this article online

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asymptomatic, have mild symptoms, or they can also have severe symptoms that can lead us to the hospital and, in critical cases, death because of a heart attack. The most significant clinical conditions are characterized by acute respiratory distress syndrome (ARDS), septic shock, and heart failure, and this causes tissue injury at the alveolar level, generating pathological tissue changes, hyperplasia, and infiltration [4]. Furthermore, the existence of dissimilar type comorbidities in individuals infected with SARS-CoV-2 can increase the response of the immune system, increasing the risk of adverse effects and mortality. This inflammation is found in people suffering from non-communicable diseases (such as diabetes and blood pressure) is closely related to severe symptoms after SARS-CoV-2 infection [5]. The nutritional impact on the immune system has been recorded in the article. In general, when possible, an effective way to decrease the risk of viral infections is in the regulation of the response to the action of inflammatory mediators through compatible risk factors, such as a healthy balanced diet, physical activity, and a healthy lifestyle. Conversely, the switching on of the population towards a destructive lifestyle (i.e. the worsening of the food and the lower of physical activity) is associated with a high risk of oxidative stress level, which could lead to the development of non-communicable diseases (NCD). He is indeed well aware that diet strongly influences the responses of the immune system. Some reports have indicated that a high body mass index (BMI) or excessive adipose tissue may be risk factors for complications during COVID-19 infection. This may be due to the presence of different lung diseases in overweight and obese populations differentiate to healthy-weight individuals. Additionally, patients with a very high weight may be considered at increased risk of developing severe COVID-19 disease due to the presence of other comorbidities that could affect their heart or lung function, as well as people with a healthy weight individual with these risk factors. For the given reasons, particularly in this pandemic, it is very important to maintain a weight and body composition according to the international recommendations for height and gender. Furthermore, recent studies have been reported by Iddi *et al.* [6]. The effect of nutritional status and intake of food in COVID-19 patients is very essential. However, studies on the effects of some nutritive are scarce and, in some investigations, these

data are obtained from ecological studies. This review aimed to provide an overview of the productive consequence of nutrients and supplements not only in the prevention of COVID-19 and the effectual care of these patients but also in the management of COVID-19 survivors.

A pilot study in Pakistan—Here, a brief communication from the authors focused on the major role of vitamin C (ascorbic acid) as an immunity enhancer factor. Furthermore, they found that a diet optimized in a set of nutrients is related to a healthy immune system. For these reasons, they strongly recommend the adoption of dietary management guidelines to support the health status of COVID-19 patients [7]. The authors suggested providing recommendations and guidelines to increase the safety of the patients by giving awareness on this important topic which is based on data gathered around the world, there must be an effective way to provide dietary recommendations [8]. In this 2020 review, the authors suggested that consuming foods that boost immunity in India may help prevent respiratory diseases or suppress disease-related issues, which could be beneficial for monitoring the spread of SARS infection [9]. CoV-2, finally, suggested improving a specific dietary intervention for each infected subject, in particular, before starting the specific treatments and their interventions [10]. New Zealand Review, advancing public health to include nutritional approaches, improve public health and reduce the impact of known and unknown viral infections [11]. A Mini-Review Italy choosing dietary regimens that can work as a supplement to prevent side effects, such as aggravated inflammation, could be beneficial for patients with mild signs of SARS-CoV-2, Naja and Hamadeh [12] suggested a review document in Brazil This review emphasized the role of nutrition as an integral part of every person's health.

For this reason, it should be important to act both in medical care and in the diet of patients with COVID-19. Furthermore, it is essential to understand the comorbidities of COVID-19 patients (they have frequently been affected by various diseases related to metabolic problems) which are associated with adverse effects and, in about 2% of cases, with death [13] discovers that the influence of this pandemic on nutrition and food intake has already gone beyond the individual and the community to reach national and

global levels, Quintela *et al.* [14] found that optimal nutrition can improve well-being and could mitigate the risk and morbidity associated with coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV -2). This review summarizes nutritional guidelines to support dietary advice provided by dieticians and health professionals. Most of the documents encouraged the consumption of fresh fruits, green leafy dark vegetables, and whole cereals [15]. In this review, the authors call attention to the importance of the nutrition aspect in COVID-19 infection, encouraging future studies to elucidate the importance of specific food regimens by conducting descriptive studies and randomized controlled trials. Lidoriki *et al.* [16] explore the latest evidence related to non-drug treatment to minimize the negative impact of COVID-19 and prevent infection [17]. In this short communication from Greece, the authors report that the nutrition status of COVID-19 patients is closely related to patient outcomes. For example, the elderly, who are generally characterized by a state of malnourishment, are more vulnerable to infection and its complications; similarly, overweight patients have worse outcomes than healthy-weight subjects after SARS-CoV-2 infection [18]. The authors suggested in this article that in China, the management of the nutritional status of hospitalized COVID-19 patients showed improvement in disease outcomes [19]. Italy Editorial several studies show that COVID-19 is related to adverse outcomes in elderly and comorbid patients with a hypo-albuminuria state. These characteristics are not unique to the Chinese, as the condition has also been described in North American patients with COVID-19. Recent literature on COVID-19 patients indirectly emphasizes the importance of diet in determining the health status of COVID-19 patients [20]. In the UK Rapid Report, whereas the fight against COVID-19 is crucial in several respects, this study suggested that the nutritional needs of the population are covered and supported, including the most endangered. Precaution, identification, and treatment of malnourishment should also be included in the regular management of hospitalized patients for COVID-19 Nutrients 2021 [21]. Perspectives for Lebanon much remain to be learned about SARS-CoV-2 infection; In particular, little knowledge has been published on the relationship between nutritional status and COVID-19 infection. In this scenario, it is important to clarify various aspects of

the role of diet. Patel *et al.* 2020 in this review, the authors focused on the main aspect of treating the hospitalized patient for COVID-19. In particular, they highlighted the role of nutrition during the stay in intensive care [22]. made the high rate of consumption of diets rich in saturated fat, sugar, and refined carbohydrates (collectively referred to as the Western diet, WD) worldwide, contributes to the prevalence of obesity and type 2 diabetes, and could place these populations are most at risk for serious illnesses and mortality from COVID-19. Through experimental research and studies on people with deficiencies, it has been shown that many vitamins (A, B6, B12, folic acid, C, D, and E) and trace elements (zinc, copper, selenium, iron) have roles key in supporting the human immune system and reducing the risk of infections [23]. In Poland Systematic review, even individuals with a mild course of infection should be kept up to date on nutritional status, particularly those of advanced age or with polymorbidity. Other essential nutrients are also important in this regard, including other vitamins and trace elements, proteins, and fats, Alkhatib [24] found that there is limited evidence that high-dose micronutrient supplements prevent serious illness or accelerate recovery. However, the results of the clinical trials are eagerly awaited. Given the known impacts of all forms of malnutrition on the immune system, public health strategies to reduce micronutrient deficiencies and malnutrition remain viable.

COVID-19 and Nutrition- Although there are conflicting data, current research indicates that supplementing numerous micronutrients could be considered important in both the precaution and management of COVID-19 infection Adequate nutrition is required for all cells of the immune system to function effectively.

Nutrition supports immune cell function by allowing them to engage with responses to pathogens, and also improve the responsiveness with underlying chronic inflammation Particular attention should be paid to substances that play an important role in regulating the immune response, considering the possibility of decreasing the risk of infection and, at the same time, improving the health status of COVID-19 patients. Healthy individuals are helping COVID-19 patients to recover their lifestyle habits. In this way it is important to consider that supplementation improves recovery in so-called COVID-19 survivors: this definition defines an

individual who has been infected with SARS-CoV-2 with a period of hospitalization in (ICU) intensive care, which is still live. The full of recovery of COVID-19 survivors, or the implementation of their health conditions, will soon be a challenging research field for the scientific community. Moreover, probiotics have played a vital role in decreasing the gastrointestinal adverse effects of COVID-19 infection. Better design of human clinical trials addressing micronutrient dosing and combinations in different populations is needed to demonstrate the benefits of excessive micronutrient intake against infections. Furthermore, when analyzing data on COVID-19 patients, it is well described that the worst outcomes occur in individuals with one or more comorbidities. Furthermore, comorbidity is closely related to metabolic diseases: for example, the overweight or obese subject is at high risk of developing the severe form of SARS-CoV-2 infection. For these reasons, it is important to consider the influence of lifestyle habits, such as unhealthy diets, on susceptibility and recovery from COVID-19. Additionally, the large number of people recovering from COVID-19 could lead to an increase in chronic medical illnesses. These conditions could be further aggravated by an unhealthy diet. Therefore, taking into account the data discussed in this review, subjects should be advised to avoid eating foods that contain high amounts of sugar, calorie-dense food, and saturated fat; instead, they must consume large amounts of fibre, whole grains, healthy fats, and antioxidants to improve immune function.

COVID-19 and Dietary Supplements- Viral infections are characterized by the deterioration of immunity resulting in an insufficient reserve of micronutrients, such as minerals (e.g. zinc, iron, selenium, magnesium, and copper), and vitamins (e.g. vitamins A, Vit- B6, Vit-B12, Vit-C, Vit-D, Vit-E, and folic acid) and are deficient [25].

Fats and oils- The consumption of various nutrients such as essential fatty acids (MUFA, PUFA), linoleic acids, linolenic acid, and high biological value proteins (milk, milk products, egg white, flesh), and the aforementioned nutrients can improve the immune response, especially where immune power can also be affected by deficiencies such as viral infections. Avoid saturated fats; refined oil, fried food products, and add Plant-based oils because they lead to the release of excessive oxidative stress. E.g. mustard oil, Canola, soybean, and olive oil.

The latest three reviews have discussed that how adequate nutritive consumption, combined with the integration of various types of functional foods, helps maintain optimal levels in the human body by better nutrients [26].

Vitamin D and C- In addition, other two recent reviews have considered several observational studies and clinical studies, in which vitamin D supplementation has been shown to reduce the risk of influenza, while others do not. In contrast, in a retrospective cohort study of 201 patients with confirmed COVID-19 pneumonia admitted to Wuhan Jinyintan Hospital in China between December 25, 2019, and January 26, 2020, the weakening of the immune system is considered the main factor during COVID-19 and seasonal disease. The immune system is strengthened by taking a healthy diet and a sufficient quantity of supplements. About 50 per cent of the population in the world are deficient in vitamin D. Mc Cartney and Byrne have been asked to do more research on this [27]. A cross-sectional study showed that the high generality of deficiency of vitamin D is a major health issue concern because deficiency of vitamin D is an unconventional risk factor for total mortality in the general population. The negative impact of vitamin D deficiency is common in particular, playing an important role in various important functions low levels of vitamin D are nearly related to the circumstance and progression of several chronic diseases such as cancer, cardiovascular disease, type 2 diabetes mellitus, and depression; Additionally, its insufficiency may be interconnected to deteriorating bone health and unhealthy immune system [28] is important to note that the deficiency of vitamin D is often linked to a maximized risk factor of respiratory infections - the latter point could be crucial in viral infections such as COVID-19. For these reasons, in the scenario of a pandemic infection, although there is still no proof in the literature that demonstrates with certainty the role of vitamin D in preventing the onset of COVID-19, the use of vitamin D-based supplements has been discussed many times as it is believed to play a major role in preventing viral infections. Recent evidence suggests that the use of micronutrient supplements can improve the immune response, reducing the risk of infections. Vitamin C, D, and zinc are essential nutrients in immune support. The micronutrient category includes the aforementioned vitamin C and vitamin D [29]. In a recent review; the

authors say that further well-designed studies on the role of vitamin supplements in the prevention and treatment of COVID-19 infections should be required. considering the biological pathways, their deregulation could be related to the outcomes of COVID-19: for these reasons, further investigations on vitamin C levels are needed at the time of COVID-19 infection, during COVID, and after infection to clarify its effects. The severity of the disease can be understood with the help of biomarkers. It is important to conduct further research focused on populations at risk, such as the elderly, pregnant women, immunosuppressed individuals, and obese individuals, to define supplementation protocols that establish dose and duration, for example using vitamin C and/or D [30]. In addition, they a need for clinical trials focusing on hospitalized patients with COVID-19 to provide further evidence on the efficacy of vitamin supplements as an adjunct to drug therapy. In contrast, in a recent clinical study, among hospitalized patients with COVID-19, a single high dose of vitamin D3, compared to a placebo, did not significantly reduce the length of hospital stay. The findings do not support the use of high vitamin D3 intake to treat moderate to severe COVID-19 [31,32].

CONCLUSIONS

In this review article, the importance of nutrition and dietary supplements in the COVID-19 pandemic is mentioned; therefore consumption of good quality food is important. A healthy diet is defined as food that contains seasonal fruits, vegetables, whole grains, pulses, legumes, moderate consumption of non-vegetarian food products, plant-based oils such as olive, canola, or soybean oil. Diet provides adequate nutrients like macronutrients, essential minerals, and vitamins so that the metabolism is strong. COVID-19 infected person should consume healthy calories to avoid unwanted weight loss, essential amount of minerals and vitamins which is very important for the body's immunity, and antibodies and lower incidence of chronic diseases and infections.

The right nutrition can ensure a strong immune system which will increase the bodies' tendency to fight and viruses. Diet modification and supplementary nutritional products could be made for the COVID-19 patients to recover and rebuild a healthy lifestyle.

ACKNOWLEDGMENTS

The authors acknowledge the help provided by the Department of Nutrition and Dietetics, Faculty of social science, MLSU Udaipur, Rajasthan, India.

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