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Eating Habit during Covid-19

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Abstract

A healthy diet is important for good health and nutrition. Optimal nutrition will improve well-being and may mitigate the danger and morbidity associated with coronavirus illness 2019 (COVID-19), caused by the severe acute metabolic process syndrome coronavirus combine of (SARS-CoV-2). This book chapter summarizes nutritional guidelines to support good eating habits during Covid-19. The majority of documents enthused the consumption of fruits, vegetables, and whole grain foods. 31% of the guidelines highlighted the importance of minerals and vitamins such as zinc and vitamin-C, A, and D to keep up a well-functioning immune system. There was no convincing proof that food or food packaging is expounded to the transmission of COVID-19, yet sensible hygiene practices for handling and making preparing foods were counselled.

Index Terms

COVID-19, Eating Behaviours, SarsCoV2.

INTRODUCTION

A healthy diet is important for good health and nutrition. It protects against several chronic non-communicable diseases, like cardiopathy, diabetes and cancer. Eating a selection of foods and consuming less salt, sugars and saturated and industrially-produced trans-fats, are essential for healthy diet. A healthy diet contains a mixture of various foods. These include: Staples like cereals (wheat, barley, rye, maize or rice) or starchy tubers or roots (potato, yam, taro or cassava), Legumes (lentils and beans), Fruit and vegetables, Foods from animal sources (meat, fish, eggs and milk) (WHO)

A new coronavirus looked in late 2019 and was referred to as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or coronavirus disease (COVID-19). It's a rigorously transmissible viral disease, that 1st emerged in Wuhan city of China then quickly extent inside China and worldwide. This occurrence started with animal-to-human infection and therefore the direct reason for death is generally due to development of severe atypical pneumonia. It created the World Health Organization (WHO) on March 11, 2020, to acknowledge COVID-19 as a world pandemic[11]. On June 26, 2020, there have been nearly ten million confirmed cases in 215 countries and therefore the 1st case detected was within the United Arab Emirates (UAE) on January 19, 2020 with 46,973 confirmed cases. COVID-19 highlights the efficiency of this, with a case-fatality rate of 2.3% and over 5,000,000 infections in 216 countries at the time of writing. The pandemic is gathering speed across the world despite a lot of more severe non-pharmacological interventions to limit its spread. The clinical spectrum of COVID-19 ranges from well carriage, mild higher respiratory tract infection (URTI), severe viral pneumonia to acute respiratory distress syndrome (ARDS) and death. Analysis has diode to identification of the angiotensin-converting enzyme (ACE) a pair of cell-entry receptor for SARS-CoV-2. Despite this discovery, a scientific study of virus dynamics and therefore the host response is nevertheless to be completed. Although vaccine development is continuing at an unprecedented pace, with reports of phase 1 trials already in progress , given the length of time required to develop, evaluate, produce, and disseminate it to 7.8 billion citizens worldwide, there is an urgent need for evidence-based treatment modalities for SARS-CoV-2. At present, no effective antiviral therapy aid has been confirmed and symptomatic verifying intervention remains the most treatment. There has been a previous suggestion that there's a task for vitamin supplementation to attenuate the severity of the communicable disease, the development of ARDS and augment the immune system via antioxidant properties. The role of vitamin and mineral supplementation or "immune-nutrition" has antecedently been explored in a number of trials in medical aid settings [1].

In past history various methods have been tried and yet being tried to combat pandemic diseases. Some these methods for fighting pandemic diseases which is include enhance awareness, protective clothing, treatment, and perhaps most importantly vaccination. Besides, quarantine was one of the most effective of these methods. Quarantine is one of the public health strategies which was undertaken on voluntary basis or can be legally enforced by higher authorities and may be bid by an individual, group, or community level. It is the separation of asymptomatic people from the society from those who were believed to be incubating the virus [2].

During the pandemic, China was the first country who made extraordinary efforts in recognizing and quarantining nearby contacts of confirmed patients to stop the spread of

infection and interrupt transmission routes. In all continents, most countries followed the same method as the infection spreads [3]. These restrictions aroused fright of an nearing economic crisis and recession. Social distancing, self-isolation and travel restrictions have led to a reduced workforce across all economic sectors and also caused many jobs to be lost. Schools had been closed down, and the need for commodities and manufactured products had also decreased. Compared to, the requirement for medical supplies had increased remarkably. The food sector was also going through an increased demand due to panic-buying and stock-piling of food products [4]. The impact of COVID-19 on the global economy is likely to be unmatched since the 1930s Great Depression. The temporary impact of COVID-19 was instantly and easily felt, due to the extensive lockdown and social distancing. Although the pandemic will end, it is already set to have enduring extreme economic, social, political, and cultural effects [5].

This paper is present data from the part of the COVID19 survey that aimed to analyse the psychological status during the COVID-19 pandemic and its correlation with the eating habits in the population

DIETARY SUPPLEMENTATION DURING COVID-19

Dietary supplementation, such as optimal nutrition, is one of the main determinants of health that can improve well-being and mitigate the negative health effects of social isolation by assisting in the prevention or control of most chronic diseases (e.g., diabetes, hypertension, and excess body weight/obesity); assisting in the regulation of sleep and mood; and preventing fatigue. Nutritional immune system regulation is also essential for people of all ages. Breast milk includes antibodies, enzymes, and hormones that can help fight against infections and respiratory illnesses in young children [13]. Changes in dietary habits cause major changes in immunity and inflammation in older individuals, the group most at risk for COVID-19. This is known as immune senescence and inflammation. Anti-inflammatory responses and increased resistance to upper respiratory tract infection have been related to several nutrients, such as omega-3 polyunsaturated fatty acids and probiotics [14].

Dietary Guidelines Intakes have been established for healthy people and are based on a 2000-calorie-per-day diet. As a result, healthcare practitioners should tailor dietary regimens to each patient's unique needs, taking into account factors such as specific diseases/conditions, medications, eating habits (e.g., vegetarianism), and activity intensity. The range between the Recommended Dietary Allowance and the Tolerable Upper Intake Level might be utilised to optimise the dietary plan for this goal [15].

Almost, one-third of the organizations and societies recommended avoiding the intake of salt, fat, and sugar and encouraged reductions in sugary drinks, other sugar-rich products, meat portions, and other foods of animal origin to lower the intake of saturated fat. In addition, they suggested that low-fat dairy foods and healthy fats (e.g., olive oil and fish oil) be included in the diet and recommended sauces, spices, and herbs as salt substitutes. It is important to know that diets low in water and rich in salt can critically impact kidney function.38 In addition, the intake of sugary drinks instead of water increases the consumption of carbohydrates and calories, thereby development blood glucose and exacerbating obesity and other related chronic diseases. Because of their low water reserves, older adults can be affected more seriously by hypo hydration (Popkin *et al.*, 2010), Furthermore, water intake comes mostly from beverages (about 75%) and food intake (about 25%), especially from fresh food such as fruits and vegetables. Therefore, the importance of drinking water, tea, and milk and consuming other water-containing foods should be carried by dietitians and healthcare professionals during the COVID-19 pandemic. Since the daily water requirement is influenced by age, sex, level of physical activity, diet, body composition, pregnancy, environmental conditions, and the presence of disease, the recommended intake of water varies widely and can reach 3.7L/d for older adults (including all water contained in food, beverages, and drinking water). Potassium, Sodium, Chloride, and Sulfate, adults with moderate levels of physical activity who consume approximately 2200kcal/ d can meet water recommendations by drinking 12 cups of water and beverages daily, while children require 4 to 5 cups per day, adolescents (9 to 18years) 7 to 11 cups per day, and older adults 9 to 13 cups per day recommended according to the Dietary Reference Intakes for Water (El-Sharkawy *et al.*, 2015).

ROLE OF MICRONUTRIENTS ON COVID-19

Micronutrients contribute to immune function through a variety of pathways in both innate and adaptive immune responses. Vitamin-A, C, D, E, B6, and B12 and zinc are important for the maintenance of structural and functional integrity of physical barriers (eg, skin, gastrointestinal lining, respiratory tract, and others) as well as for the differentiation, proliferation, function, and migration of innate immune cells. Meanwhile, vitamin-C along with zinc and selenium, protect against free radical damage during increased oxidative stress. Vitamin-A, C, D, B6 and B12 and zinc and selenium support the adaptive immune response by influencing the differentiation, proliferation, and normal function of T and B cells. These nutrients also affect antibody production and function contributes to cell-mediated immunity, and support the recognition and destruction of pathogens [23].

In developing countries, there are inadequate food intake and poor dietary quality result in micronutrient deficiencies and affects a large number of people, as well as subgroups like the elderly and HIV infected individuals. The maximum extensively studied vitamin deficiency is that for vitamin a, that can be affects up to 254 million young children worldwide [24].

Reproductive age of women is also at high risk of vitamin A deficiency (VAD) in many developing countries. Vitamin A supplementation improves breast milk quality improves

anemia and may decrease maternal mortality [25]**.** Other common vitamin deficiencies consist of the B vitamins, especially folic acid, B6, B12, thiamin (B1), riboflavin (B2), as well as vitamin C, while reliable data on the magnitude of these deficiencies are limited. Deficiencies of the other fat-soluble vitamins, namely D, E, and K are less common, and subgroups may be at risk.

One study demonstrated protein-energy malnutrition in young children increased their susceptibility to common childhood illness such as diarrhea and acute respiratory infections which, in turn, increased their risk of being undernourished and the result showed reduced food intake and increased losses from poor absorption and metabolism [26].

VITAMIN-A AND ITS IMPACT ON COVID-19

Immune organs are organs or tissues that realize immune function, and are places where most immuno competent cells proliferate, differentiate, mature, aggregate and respond to immunity. Research has shown that crucial immune organs need constant dietary intake to maintain VitA concentrations, and to regulate the apoptosis of thymocytes (Riabroy *et al.*, 2014). In the thymus, endogenous retinoid synthesis and retinoids similar to gluco corticoids might indeed, be involved in the regulation of thymic proliferation and selection processes, by being present in the thymus in functionally effective amounts [27].

The pulmonary, immunomodulatory, and antimicrobial roles of vitamin A may enact a crucial element in the fight against viral diseases, including COVID-19. From a pulmonary perspective, retinoic acid has been implicated in modulating the pathogenesis of ARDS, influencing the production of IL1-β and IL-1 receptor antagonist by alveolar macrophages, and the subsequent pulmonary infiltration of neutrophils. Retinoids have been implicated in the development of an innate immunity against measles virus in vitro through an interferon-mediated mechanism, which in particular renders bystander cells protected against a subsequent round of viral replication [35]. The vitamin has been the subject of animal studies looking at inactivated bovine coronaviruses, with dietary supplements shown to increase the effect of antibody responses to the vaccine in feedlot calves and lower levels of vitamin A in chickens with viral infections has been associated with an increased rate of epithelial damage to tissues [36]. In light of pulmonary and immunological roles, oral supplementation of vitamin A is currently being investigated in the treatment of COVID-19 alongside a host of other antioxidants [37].

Vitamin A supplementation is responsible for some protection against complications of life-threatening infections like malaria, lung diseases and HIV· In animal studies has been shown low vitamin A diets compromise the usefulness of inactivated coronavirus vaccines and reduce calves more susceptible to infectious disease and the effect of infection with infectious bronchitis virus (IBV), a kind of coronavirus, which was more pronounced in chickens fed a lower vitamin A diet. The daily recommended dietary allowance for Vitamin-A is 900 (males) and 700 (females) ug retinol activity equivalents.

VITAMIN-C AND ITS IMPACT ON COVID-19

Vitamin C is a crucial nutrient which cannot be synthesized by humans due to loss of a key enzyme in the biosynthetic pathway. Results of Severe vitamin C deficiency have been shown in the potentially fatal disease scurvy. Scurvy is characterized by weakening of collagenous structures, resulting in poor wound healing and weakened immunity. Individuals with scurvy are highly susceptible to potentially fatal infections like pneumonia . while infections can significantly impact on vitamin C levels caused by enhanced inflammation and metabolic requirements [16].

Vitamin c has a sum of activities that can be conceivably contribute to its immune-modulating effects. Vitamin c is a highly effective antioxidant, due to its ability to readily donate electrons, thus protecting important biomolecules (proteins, lipids, carbohydrates, and nucleic acids) from damage by oxidants generated during normal cell metabolism and through exposure to toxins and pollutants (e.g., cigarette smoke). Vitamin C is also a cofactor for a family of biosynthetic and gene regulatory mono oxygenase and dioxygenase enzymes. The vitamin has long been known as a cofactor for the lysyl and prolyl hydroxylases required for stabilization of the tertiary structure of collagen, and is a cofactor for the two hydroxylases involved in carnitine biosynthesis, a molecule required for transport of fatty acids into mitochondria for generation of metabolic energy [16].

Vitamin C supplementation may be beneficial for those who are at risk of respiratory virus infections, according to the Brazilian Association of Clinical Nutrition. Vitamin C is a well-known antioxidant that can boost chemotaxis, phagocytosis, reactive oxygen species production, and, ultimately, germ death [16]. However, a comprehensive analysis comprising 10708 individuals found that vitamin C dosages more than 1 g/d were not effective in lowering the overall incidence of colds. Such dosages, on the other hand, could be beneficial in decreasing the duration of colds by 8% to 18%. Vitamin C may also help to prevent colds in those who have been exposed to severe physical activity or cold temperatures for short periods of time [17].

Vitamin C is one of the major constituents of water soluble vitamins which have a tendency to make a strong immune system. The daily recommended dietary allowance for Vitamin C is 90mg/d for men and 75mg/d for women. In the current situation, it is necessary to be aware of the specific types of food that can improve our immune system in order to combat COVID-19 such as fruits (guava, apple, banana, strawberry, cantaloupe melon, grapefruit, pineapple, papaya, orange, Longman fruit, blackcurrant, pummelo) with fresh vegetables (green bell peppers, garlic, ginger, kale, lime, coriander (dried), broccoli, green chilli pepper).

VITAMIN-D AND ITS IMPACT ON COVID-19

Vitamin D was considered as vitamin and was known to be one of the four fat soluble vitamins. However, research work has been shown Vitamin D is a prohormone and it is recognized now that Vitamin D has many other biologic actions outside the musculoskeletal system. Vitamin D3 (cholecalciferol), which is the natural form of Vitamin D and present in low amount in animal food sources and almost absent in vegetables and Vitamin D2 (ergocalciferol) is present in some vegetables such as mushroom. Vitamin D3 is produced in the skin through the action of sun rays on a derivative of cholesterol, 7-dehydrocholesterol, to produce previtamin D3. Then, previtamin D3 is slowly isomerized to vitamin D3; cholecalciferol. Through sunlight the dual source of Vitamin D activate in the skin and diet intake, secures sufficient levels of Vitamin D in the body, although the main source for production of vitamin D3 is through the skin. Exposure of the precursor 7-dehydrocholesterol in the basal and supra basal layers of the epidermis to ultraviolet B (UVB) light with a wavelength of 290-315 nm is necessary for the formation of the previtamin D3. Therefore, the level of production of vitamin D3 in the skin is mainly affected by the amount of UVB radiation to which the skin is exposed. Other factors affecting this cutaneous synthesis of vitamin D3 include geographical area, season of the year and time of the day [30].

The active form of Vitamin-D, 1, 24-dihydroxyvitamin D3, vitamin D showed to act as a powerful immunoregulator which is capable of suppressing Th1 response. It has been shown to constrain T-lymphocyte proliferation and immunoglobulin production, decline natural killer cell toxicity and decrease the production of IL-2, IL-12. In contrast, 1,25-dihydroxyvitamin D3 increases synthesis of IL-4, IL-5, and IL-12 along with IgA and it is believed this vitamin might be act to promote a Th2 response .

Vitamin D reduces the risk of acute respiratory infections. Vitamin D supplementation is safe and protects against acute respiratory tract infection. The daily recommended dietary allowance for Vitamin D is 600 IU. In the current situation, it is necessary to be aware of the specific types of food which can improve our immune system in order to combat COVID-19 such as Milk, yogurt, egg, cheese, cod liver oil, orange juice, salmon and tuna [31].

B VITAMIN AND ITS IMPACT ON COVID-19

The B vitamins are a group of water soluble, chemically quite distinct compounds to which other than vitamin B6, vitamin B1 (thiamine), B2 (riboflavin), B3 (niacin or niacin amide), B5 (pantothenic acid), B7 (biotin), B9 (folic acid), and B12 (various cobalamins) also belong. Vitamin B complex members are used in our body to promote the defensive role for better health and prevention of diseases by boosting-up the immune system. Types of vitamins that fall in this category of vitamin B complex play a key role by acting as antioxidants in the body thus enhancing the efficiency of the immune response [29].

Each B vitamin has special functions specially Vitamin-B6 and B12 has support the adaptive immune response by influencing the differentiation, proliferation, and normal function of T and B cells.

Vitamin B_6:

Vitamin B6 acts as co-factor for certain enzymes which is helps the in carrying out their respective functions [32]. B6 comprises 3 pyridine derivatives thus it is named as pyridoxine. Vitamin B6 helps control levels of homocysteine in the blood. Homocysteine is a common amino acid which is associated with heart diseases like Acute Coronary Syndrome (ACS) and cardiovascular death, collectively called athero-thrombosis when it has shown higher level of homocysteine (hyperhomosysteinaemia) [33].

The body requires vitamin B6 in order to absorb vitamin B12 and to make red blood cells and cells of the immune system. Vitamin B6 helps the body to make various neurotransmitters like serotonin, chemicals which can carry signals from one nerve cell to another. Serotonin is synthesized by the tryptophan and this conversion of tryptophan to serotonin happens in the presence of pyridoxal phosphate which is a vitamin B6 derivative .Vitamin B6 is requires for normal brain development and function and it helps the body to make nor-epinephrine, which is influences the mood and melatonin is a hormones that helps in regulating the body clock. Symptoms of serious deficiency included muscle weakness, nervousness, irritability, depression, difficulty concentrating and sometimes short-term memory loss. According to National Institute of Health in USA, the Recommended Dietary Allowance of vitamin B6 for adults should be 2 mg per day. Vitamin B6 helps to increase immune response to improve production of antibodies and also helps in communicative interactions between cytokines and chemokine's. Deficiency of Vitamin B6 reduces the lymphocyte growth and proliferation, antibody formation and T-cell activity [33].

Vitamin B_{12}:

Vitamin B_{12} is also essential in erythrocyte production and cellular proliferation. Deficiency leads to megaloblastic anemia with respect to immune cells, impaired neutrophil function. Deficiency is also associated with decreasing CD4 counts and increased disease progression among men with HIV/AIDS. B12 supplementation showed improves antibody function and lymphocyte production. Patients in B12-deficient AIDS, supplementation improved lymphocyte counts, CD8+ counts, and natural killer cell activity. Its role in the Th2/Th1 response has not been elucidated, although researchers speculate that B12 deficiency may suppress the Th2 response [34].

OTHER MICRONUTRIENT (ZINC AND SELENIUM) AND ITS IMPACT ON COVID-19

Antioxidant micronutrients zinc and selenium are frequently recommended for supplementation. Superoxide dismutase, an enzyme found in the mitochondria and

cytoplasm of cells that protects against oxidative stress, requires zinc as a cofactor. Excess zinc, on the other hand, promotes oxidative stress in cells. A narrative review found substantial evidence of zinc's antiviral efficacy against a number of viruses, including influenza (10 mg/kg body weight, up to 600 mg/d total) [21]. Zinc is also required for the generation of both innate and acquired (humoral) antiviral responses. The authors concluded, however, that more study into the antiviral mechanisms and clinical advantages of zinc supplementation as a preventive and therapeutic therapy for viral infections is required. According to a new study, the elderly are at risk for zinc deficiency, which makes them more susceptible to diseases like pneumonia. In this group, zinc supplementation (i.e., elemental zinc, 30 mg/d) may be sufficient to enhance immune function and reduce infection risk (Barnett *et al.*, 2010).

Selenium has been reported to enhance a number of host immunological responses, including interferon c production, T-cell proliferation, antigen stimulation, and natural killer cell activity, via increasing the activity of glutathione peroxidase, another antioxidant enzyme. In fact, a research using mice and the influenza virus found that selenium deficiency resulted in more severe illness and a higher pro-inflammatory immune response, culminating in greater pulmonary pathology. Selenium is a trace element that may be found in a variety of foods, including nuts, breads, cereals, meat, chicken, fish, and eggs, and is easily obtained via diet [22].

CONCLUSION

While no foods or dietary supplements will prevent or treat COVID-19 infection, nutritious diets are critical for immune system support, as stated in this book chapter. With good diet Obesity, heart disease, diabetes, and some kinds of cancer may all be prevented. It was also stated quarantine has positive and negative effects and during the pandemic, some people returning to home meals and reducing fast food consumption. Consuming foods that support the immune system, planning times to eat, meals, portions, having positive thoughts can help to cope with the negative health effects of quarantine. The changes in eating habits caused by increased stress due to quarantine stand out as an important problem because of increased in food consumption and a tendency towards snacking.

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