

The Impact of Nutrition on COVID-19 Susceptibility and Long Term Consequences

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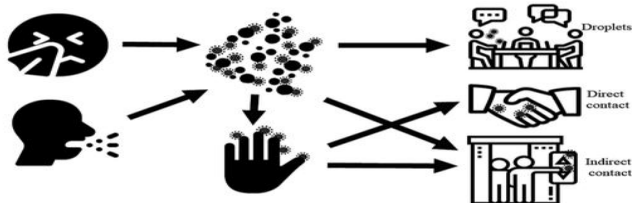
1. Introduction

Coronavirus disease 2019 (COVID-19) is defined as illness caused by a novel coronavirus now called severe acute respiratory syndrome coronavirus (SARS-CoV; formerly called 2019-nCoV), which was first identified aimed an outbreak of respiratory illness cases in Wuhan City, Hubei Province, China. Certain factors such as lifestyle, age, health status, sex, and medications affect the nutritional status of an individual. Covid-19 attacks people with low immune systems and especially people of under and over ages. The immune system is built on beneficial a live bacterium that lives in the gut which protect the human body from various diseases. When the immune system response is low, weak, or damaged, it becomes an open invitation for infections such as *coronavirus* or other diseases. Maintaining personal hygiene and healthy life style is advised by physicians during Covid outbreak.



2. Transmission of COVID-19 & Best Practices

COVID-19 transmission routes: droplets, direct contact, and indirect contact



The major routes of transmission of SARS-CoV-2 are believed to be person-to-person transmission through respiratory droplets, close unprotected contact with an infectious individual, and touching items that have been

contaminated. Practices like frequent hand hygiene, physical distancing from others when possible, and respiratory etiquette; avoid crowded places, close-contact settings and confined and enclosed spaces with poor ventilation; wear fabric masks when in closed, overcrowded spaces to protect others; and ensure good environmental ventilation in all closed settings and appropriate environmental cleaning and disinfection.

3. Symptoms of COVID-19



Symptoms can range from mild to severe illness, and appear 2–14 days after you are exposed to the virus that causes COVID-19.

Seek medical care immediately if someone has
Emergency Warning Signs of COVID-19

- Trouble breathing
- Persistent pain or pressure in the chest
- New confusion
- Inability to wake or stay awake
- Bluish lips or face

This list is not all possible symptoms. Please call your healthcare provider for any other symptoms that are severe or concerning to you.

4. COVID-19 Symptoms and Nutritive Diet

Foods good for reducing Cold and Cough

Phytochemicals are natural chemicals found in plants that give the vitamins in food a supercharged boost. Eat dark green, red, and yellow vegetables and fruits. 100% orange juice and oranges provide a good source of potassium for a healthy blood pressure, folic acid and an excellent source of antioxidant Vitamin C, which has been shown to help support a healthy immune system. The perfect on-the-go snack, apples are rich in flavonoids. The antioxidant power of apples is estimated to have more than 1, 500 mg of

vitamin C. Cranberries Scientific studies suggest that people who eat foods rich in certain polyphenols have lower rates of inflammatory disease. The great news is that these beneficial phytonutrients can be enjoyed in different types of cranberry products, fresh, dried, canned or frozen cranberries. Pineapples are known for their anti-inflammatory enzyme bromelain. Bromelain has been reported to calm a cough and soothe a sore throat. The rich source of vitamin C is an added bonus for prevention. Sweet potatoes not usually “cold-preventing” food but they are a stellar source of Vitamin A, which plays a key role in maintaining the health of the mucosal surface.

Foods good for reducing fever

Fluid-rich foods: Drink water, hot tea, fresh fruit juice. Intake of fluid-rich foods is recommended such as poultry broths, thin soups, coconut water. Fresh fruits: Fruits like apples, oranges, watermelon, pineapple, kiwi are rich in vitamin C. This contains antioxidants that reduce fever. Avoid fruits with heavy sugar and fruits canned in syrup because sugar inhibits the immune system. The banana provides vital nutrients and easy to digest. Proper intake of proteins: Scrambled eggs, smoothie with low-fat milk, pulses, chana or Indian cottage cheese are rich in protein and beneficial.

Foods good for reducing diarrhoea and vomiting

During the first 12 to 24 hours, you should follow diet such as drink plain water, sport drinks like electrolyte solutions, drinks without caffeine, mineral water (plain or flavoured), and clear fruit juices. Do not have drinks with caffeine or citrus juices. This is because they are high in acid and can irritate your stomach. Soup generally clears the broth. Desserts: Plain gelatine, frozen ice pops, and fruit juice bars without pieces of fruit. As you feel better, you may add 6 to 8 ounces of yogurt per day. If you have diarrhoea, don't have foods or drinks with sugar, high-fructose corn syrup, or sugar alcohols. During the next 24 hours you may add the following to the above: Hot cereal, plain toast, bread, rolls, and crackers. Unsweetened canned fruit (but not pineapple) and bananas. Don't eat more than 15 grams of fat a day. Do this by staying away from margarine, butter, oils, mayonnaise, sauces, gravies, fried foods, peanut butter, meat, poultry, and fish. Don't eat much fibre. Stay away from raw or cooked vegetables, fresh fruits (except bananas), and bran cereals. Limit how much caffeine and chocolate you have.

Foods good for reducing loss of smell

Eat apples instead of pumpkins-The naturally occurring anti-bacterial agent in apples helps fight bad breath and act like a mouth freshener. Excess of trimethylamine in your body can cause body odour. Eat citrus fruits instead of cruciferous vegetables-Citrus fruits, such as oranges, lemons and pineapples, leaving you with fresh smell from your skin. Additionally, the acids in these fruits causes water to flush out toxins that cause unpleasant odours out of the body. Eat white fish instead of pink fish-White fish won't make you smell better, but it won't make you smell at all. Eat yoghurt instead of milk-the live active cultures inherently found in

probiotic yoghurt also helps neutralise odour causing sulphur compounds in your body. The beneficial bacteria found in yoghurt also help further combat toxins in our system, which further helps neutralise odour causing bacteria. Milk contains a chemical called choline that can causes a nasty body odour. Drink green tea instead of coffee- Polyphenols are antioxidants that reduce odour causing sulphur compounds in the body and help fight off other bacteria that can cause bad breath. Additionally, the tannins found in both green and black tea can help keep your foot dry, preventing a foot odour.

Foods good for reducing Muscle and body ache

Curcumin is the main active ingredient in turmeric. It's been found to have powerful anti-inflammatory effects and is a very strong antioxidant. Garlic may reduce inflammation from joint pain. The anti-inflammatory sulphur compounds are found in garlic. Cherries-Cherries have compounds in them known as anthocyanins. These are antioxidants that work to alleviate pain. Research shows that antioxidants in tart cherry juice can reduce pain and inflammation from osteoarthritis. Cherries are a rich source of polyphenols and vitamin C, both of which have antioxidant and anti-inflammatory properties. Salmon-Salmon is chock-full of omega-3 fatty acids. Omega-3s interfere with immune cells called leukocytes and enzymes called cytokines, which are both main players in inflammation. The omega-3 fatty acids stop the process before it even starts. Choosing fibrous, nutrient-dense carbohydrates over refined and processed carbohydrate can have an effect on decreasing inflammation. Optional for lower-sodium foods, too. Excessive sodium in the diet can lead to water retention, which can increase joint pain.

Steps to Support a Healthy Immune System

Eat a balanced diet with whole fruits, vegetables, lean proteins, whole grains, and plenty of water. A Mediterranean Diet is one option that includes these types of foods. If a balanced diet is not readily accessible, taking a multivitamin containing the RDA for several nutrients may be used. Don't smoke (or stop smoking if you do). Drink alcohol in moderation. Perform moderate regular exercise. Aim for 7-9 hours of sleep nightly. Try to keep a sleep schedule, waking up and going to bed around the same time each day. Our body clock, or circadian rhythm, regulates feelings of sleepiness and wakefulness, so having a consistent sleep schedule maintains a balanced circadian rhythm so that we can enter deeper, more restful sleep. Aim to manage stress. This is easier said than done, but try to find some healthy strategies that work well for you and your lifestyle whether that be exercise, meditation, a particular hobby, or talking to a trusted friend. Another tip is to practice regular, conscious breathing throughout the day and when feelings of stress arise. It doesn't have to be long—even a few breaths can help. If you'd like some guidance, try this short mindful breathing exercise. Wash hands throughout the day: when coming in from outdoors, before and after preparing and eating food, after using the toilet, after coughing or blowing your nose. Social distancing and regular hand washing are the most effective and proven methods to reduce risk and spread of the coronavirus disease (COVID-19).

Diabetes and COVID-19

Healthy nutrition is an essential component of diabetes management. It is therefore important for people with diabetes to eat a varied and balanced diet to keep their blood glucose levels stable and enhance their immune system. It is recommended to give priority to foods with a low glycaemic index (e.g. vegetables, whole wheat pasta/noodles). Avoid excessive consumption of fried foods. Limit consumption of foods high in sugar, carbohydrates and fat. Choose lean proteins (eg. fish, meat, eggs, milk, beans after fully cooked). Eat green, leafy vegetables. Eat fruits in two or three servings. In response to the COVID-19 pandemic, governments in many countries have restricted the movement of their citizens, confining them to the home environment. Regular physical activity is of great benefit to the general population and even more for people living with diabetes.

“It is health that is real wealth and not pieces of gold and silver.” – **Mahatma Gandhi**



Healthy Eating – Susceptibility

Eat fresh and unprocessed foods every day

Eat fruits, vegetables, legumes (e.g. lentils, beans), nuts and whole grains (e.g. unprocessed maize, millet, oats, wheat, brown rice or starchy tubers or roots such as potato, yam, taro or cassava), and foods from animal sources (e.g. meat, fish, eggs and milk). Daily, eat: 2 cups of fruit (4 servings), 2.5 cups of vegetables (5 servings), 180 g of grains, and 160 g of meat and beans (red meat can be eaten 1–2 times per week, and poultry 2–3 times per week). For snacks, choose raw vegetables and fresh fruit rather than foods that are high in sugar, fat or salt. Do not overcook vegetables and fruit as this can lead to the loss of important vitamins. When using canned or dried vegetables and fruit, choose varieties without added salt or sugar.

Eat moderate amounts of fat and oil

Consume unsaturated fats (e.g. found in fish, avocado, nuts, olive oil, soy, canola, sunflower and corn oils) rather than saturated fats (e.g. found in fatty meat, butter, coconut oil, cream, cheese, ghee and lard). Choose white meat (e.g. poultry) and fish, which are generally low in fat, rather than red meat. Avoid processed meats because they are high in fat and salt. Where possible, opt for low-fat or reduced-fat versions of milk and dairy products. Avoid industrially produced trans fats. These are often found in processed food,

fast food, snack food, fried food, frozen pizza, pies, cookies, margarines and spreads.

Eat less salt and sugar

When cooking and preparing food, limit the amount of salt and high-sodium condiments (e.g. soy sauce and fish sauce). Limit your daily salt intake to less than 5 g (approximately 1 teaspoon), and use iodized salt. Avoid foods (e.g. snacks) that are high in salt and sugar. Limit your intake of soft drinks or sodas and other drinks that are high in sugar (e.g. fruit juices, fruit juice concentrates and syrups, flavoured milks and yogurt drinks). Choose fresh fruits instead of sweet snacks such as cookies, cakes and chocolate.

Avoid eating out

Eat at home to reduce your rate of contact with other people and lower your chance of being exposed to COVID-19. We recommend maintaining a distance of at least 1 metre between yourself and anyone who is coughing or sneezing. That is not always possible in crowded social settings like restaurants and cafes. Droplets from infected people may land on surfaces and people’s hands (e.g. customers and staff), and with lots of people coming and going, you cannot tell if hands are being washed regularly enough, and surfaces are being cleaned and disinfected fast enough.

Counselling and psychosocial support

While proper nutrition and hydration improve health and immunity, they are not magic bullets. People living with chronic illnesses who have suspected or confirmed COVID-19 may need support with their mental health and diet to ensure they keep in good health. Seek counselling and psychosocial support from appropriately trained health care professionals and also community-based lay and peer counsellors.

5. Conclusion

Consuming good quality diets is always desirable, and this is particularly important during the COVID-19 pandemic. A healthy diet, as depicted by the Healthy_Eating_Plate, emphasizes fruits, vegetables, whole grains, legumes, and nuts, moderate consumption of fish, dairy foods, and poultry, and limited intake of red and processed meat, refined carbohydrates, and sugar. Added fats should be primarily liquid oils such as olive, canola, or soybean oil. Such a diet will provide appropriate amounts of healthy macronutrients and essential minerals and vitamins. Eating high-quality sources of protein, fat, and carbohydrate can help maintain a healthy weight and good metabolic state; this is not a time for highly restrictive, crash diets. If someone does develop a COVID-19 infection, eating enough of these healthy calories to prevent unintended weight loss is important. Adequate amounts of mineral and vitamins provided by a healthy diet helps to ensure sufficient numbers of immune cells and antibodies, which are important as the body mounts a response to infections.

References

- [1] World Health Organisation. Nutrition. Nutrition advice for adults during the COVID-19 outbreak.
- [2] Monash Food as Medicine. "Nutrition for Immunity during COVID-19" Extra Helpings: From the 'Food as Medicine' series. Published on 7 April 2020.
- [3] Fallon E, McAuliffe S & Ray S. on behalf of the NNEdPro Global Centre for Nutrition and Health 26th March 2020.
- [4] Combatting COVID-19: A 10 point summary on diet, nutrition anField CJ, Johnson IR, Schley PD. Nutrients and their role in host resistance to infection. *J Leukoc Biol.* 2002;71:16-32d the role of micronutrients.
- [5] Holick MF. Sunlight and vitamin D for bone health and prevention of autoimmune diseases, cancers, and cardiovascular disease. *Am J Clin Nutr.* 2004;80:1678S-1688S.
- [6] Martineau AR, Jolliffe DA, Hooper RL, et al. Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data. *BMJ.* 2017;356:i6583. Published 2017 Feb 15. doi:10.1136/bmj.i6583
- [7] Baugreet S, Hamill RM, Kerry JP, McCarthy SN. Mitigating nutrition and health deficiencies in older adults: a role for food innovation?. *Journal of food science.* 2017 Apr;82(4):848-55.
- [8] Zhang L, Liu Y. Potential interventions for novel coronavirus in China: A systematic review. *J Med Virol.* 2020;92(5):479–490. doi:10.1002/jmv.25707
- [9] Schoeman D, Fielding BC. Coronavirus envelope protein: current knowledge. *Virol J.* 2019;16:69