



Original Research Article

An Optimized Dietary Plan for Strengthening the Immune System During COVID 19 Crises

Indra Shivnani¹, Deepa Shivnani^{2,*}, Dnyanesh Amle³

¹Dept. of Nutrition, Nutrimatra Diet Clinic, Rajasthan, India

²Dept. of Pediatric Otorhinolaryngology, Manipal Hospital, Bangalore, India

³Dept. of Biochemistry, All India Institute Of Medical Science, Nagpur, Maharashtra, India



ARTICLE INFO

Article history:

Received 18-05-2021

Accepted 04-06-2021

Available online 22-06-2021

Keywords:

COVID 19

Nutrition

Supplements

Protein

Vit C

Vit D

Zinc

ABSTRACT

The World Health Organization announced corona virus disease 19 (COVID 19) as a global pandemic. As the government has implemented various policies, the major challenge was to support immune system in general population who are under self-confinement. An optimal diet plan and nutritional supplements are advised to effectively boost the immune system during the COVID 19 crises. We have suggested an optimized dietary plan for an adult with adequate requirements. A balanced diet could help strengthen the immune system of individuals and prepare to fight against COVID 19.

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1. Introduction

As we all know the severe acute respiratory syndrome corona virus 2 (SARS-CoV 2) had been declared a global pandemic by World health Organization in year 2020.^{1,2} The usual presentation might have cough, fever, myalgia and breathing difficulties. More severe cases might present with various multi system dysfunction, septic shock or cardiac complications. These complications were believed to be associated with cytokine storm, excess immune response and hyper inflammation.³

The government has implemented various policy and restrictions on physical movements to prevent further spread of the disease. This self-confinement has created stress, sedentary life style as well as affected the dietary habits in various ways such as changes in eating behavior, limited access to food, running out of staple items, perception of food safety, higher consumption of processed and package

food with high caloric content, high saturated fats, sugars and refined carbohydrate levels. All these factors with sedentary life style might increase in obesity prevalence in community.²⁻⁴ So, the purpose of this article is to provide importance of nutrient supplements and prepare a sample diet chart which can prevent the obesity at certain extent with immune booster efficacy.

2. Discussion

According to an observational study, the nutritional status plays a pivotal role in the clinical outcomes of patients recovering from COVID-19, and that nutritional support along with rehabilitation may improve the chances of recovery in patients of COVID-19.⁵

The food habits and dietary behaviour have changed due to COVID 19 pandemic. An international online survey with 1047 participants from different continents has concluded increase in sitting time and reduction and physical activity during lockdown periods. It also proved that lockdown and

* Corresponding author.

E-mail address: deepa.shivnani14@gmail.com (D. Shivnani).

isolation was associated with unhealthy dietary patterns with increase snacking between meals.⁶ Another study from France concluded that lockdown was related to decrease in the nutritional quality of food.⁷ The study from Poland has concluded significant dietary modification due to quarantine with increase snacking and weight changes.⁸

A combined Study from Italy, Spain and Brazil showed higher sweet food consumption in adolescents likely due to stress produced by COVID 19 confinement.⁹ The European society for clinical nutrition and metabolism has recently discussed about the obesity and severity of COVID 19. Adequate dietary intake might protect against inflammatory response of covid infection and might improve the disease outcomes.¹⁰ A poly phenol containing product like nuts and dried fruits such as raisins promotes the production of anti-oxidants and anti-inflammatory molecules. Polyphenols specifically flavonoids and its metabolites produce anti-oxidants and anti thrombotic effects which plays critical role in COVID 19 illness.¹¹ A recent study on influence on immunity in COVID19 by sebastia et al. showed that sub optimal consumption of vitamin D, vitamin C, Vitamin B12 and iron is correlated with either COVID 19 incidence or a mortality indicator.¹²

Therefore, it is important to encourage people for healthy dietary habits and appropriate nutritional behaviour during COVID 19. This article provides insight to the general public to include dietary supplements in their diet for improving and strengthening of immune system. It is recommended that a diet with a variety of fresh foods & unprocessed food is followed daily to provide the body with the necessary vitamins, minerals, dietary fibers, protein & antioxidants.^{13–15}

2.1. Some nutrients with the strongest evidence for immune support are:

1. Protein
2. Vitamin C,
3. Vitamin D, & Micronutrients
4. Zinc

2.2. Protein

Protein makes up the building blocks of organs, muscles, skin & hormones. It's Important to consume at least 2-3 servings of protein rich food per day. -30 gm of pulses (dal, channa, soy bean, soya chunks & Rajmah) Gives 6.3 gm protein.

1. 1 cup (150 ml) cow's milk gives 4.9 gm protein.
2. 1 Egg (100 gm) gives 13.4 gm
3. 1 cup (100 gm) Paneer gives 18.8 gm
4. 1 Fish (100gm) gives 20gm

2.3. Vitamin c

Vitamin C Contribute to immune defense by supporting various cellular functions of both the innate & adaptive immune system.

1. Amla 100gm gives-252 mg
2. Guava (100gm) gives 214mg
3. Capsicum (100gm) gives 122mg
4. Raw Mango(100gm) gives 90mg
5. Amaranth (100gm) gives 86mg

2.4. Zinc

Zinc is crucial for normal development & function of immune cell.

1. Cereals (30gm) gives 0.5mg
2. Pulses (30gm) gives 1mg
3. Soybean (30) gives 1.2mg
4. Nuts & seeds (15gm)gives 0.6mg
5. 1 Egg gives 1.8mg

2.5. Vitamin d

A human body produces vit D as a response to sun exposure. A person can also boost their vit D intake through certain food items.

1. Egg Yolk gives 37 IU
2. Mushroom (30gm) gives 690 IU
3. Fortified Cereal (78gm) gives 36 IU
4. Fatty Fish (100gm) gives 526 IU
5. Fortified Cow Milk (237ml) gives 125 IU
6. Fortified Orange Juice (27ml) gives 100 IU

To keep this in mind, we have created a modified balanced diet chart for an average adult weighing approximately 60kg with appropriate nutritional requirements and immune efficacy. The appropriate requirements and above-mentioned nutritive values have been taken from IFCT (Indian Food Composition Tables), National Institute of nutrition.¹⁶

2.6. Diet plan for an adult with 60 kg body weight

NOTE: Add mint leave, curry leave, Coriander leaves & Condiments & spices in your all meals. It will fulfill your other minerals requirement as well like magnesium, sodium, folic acid, calcium etc.

3. Conclusion

The dietary recommendations and early nutritional intervention in SARS-CoV-2 exposed or high-risk subject might optimize the immune system. Such an approach is simple, cheap, and harmless to follow with adequate physical exercise. It is advisable to follow recommended

Table 1: Nutritional requirements /day

Calories	2671 kcal
Carbs	267 gm
Protein	90 gm
Fat	30 gm
Fiber	35 gm
Water	2.5 -3 ltr
Zinc	17 mg
Iron	19 mg
Vit. C	80 mg
Vit. D	600 IU

Table 2:

Meal	Menu	Portion
Early morning (7:00am)	Luke warm lemon water + Flaxseed/ sesame seed / sunflower seed	1 glass 1 table spoon(15 gm)
	After 20 min Masala tea/ Turmeric milk + almond/cashew/ pistachio/walnut	70 ml/ 150ml 10 no.
Breakfast (9:00 am)	Veg poha/ Oats + 1 orange	1 cup (100gm)
	3-4 Idli + Samber+ papaya 2 Boiled eggs with 2brown bread + apple Veg dal Daliya (Onion, tomato, cabbage, capsicum, peas, garlic)	1 Bowl+ 50 gm 1 bowl (150-200gm)
Mid-Morning (11-12 pm)	Banana/ avocado shake Fruit Salad* (guava, musk melon, watermelon, grapes, cherries) Green smoothies (Palak, mint, coriander, lemon)	1 glass (200ml) 150gm 200 ml
Lunch 2-3pm	Kachumber (tomato,cucumber,cabbage,onion)	60gm
	Any Dal (dal/ Rajmah/ chole/soya bean)	30gm
	Leafy veg	30 gm
	Other veg (bitter gourd/ mushroom/ Lotus stem/ drumstick)	
	Rice (brown/white)	30 gm
	Multigrain roti (If you don't take rice then take 3 roti) Curd/ buttermilk	30 gm 30 gm 2 no(medium) 50gm/ 250ml
Evening 5-6pm	Masala tea/ muskmelon juice + Sprouts/ roasted peanut/channa (Add $\frac{1}{2}$ lemon on it)	1 cup/ 200ml 50gm
	Dinner 8pm	Veg /Dal soup/ Chicken broth Mix veg + roti + curd Roasted fish/ chicken Veg dal khichdi + curd Paneer Veg + rice/ roti + curd
Bed time 10pm	Turmeric / cardamom milk+ Walnut/ Pistachio	1 bowl (150 ml) 30gm + 2 no, 30 gm 100gm 1bowl(150gm)+ 50gm 50gm,30gm/12roti+30gm 150ml 5-10no.

upper tolerable intake levels for long-term intakes of the micro nutrients. To obtain general immunity, strict adherence to appropriate and balanced diet is very important during these COVID times. We are not sure when the self-refinement will get over but adequate nutrition might help in prevent of undue obesity caused by faulty dietary habits and sedentary life style during these times.

4. Source of Funding

None.

5. Conflict of Interest

None,

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Author biography

Indra Shivnani, Dietitian

Deepa Shivnani, Associate consultant

Dnyanesh Amle, Associate Professor

Cite this article: Shivnani I, Shivnani D, Amle D. An Optimized Dietary Plan for Strengthening the Immune System During COVID 19 Crises. *IP J Nutr Metab Health Sci* 2021;4(2):47-50.