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REVIEW ARTICLE

**COVID-19 Food Pyramid: A Novel Approach**

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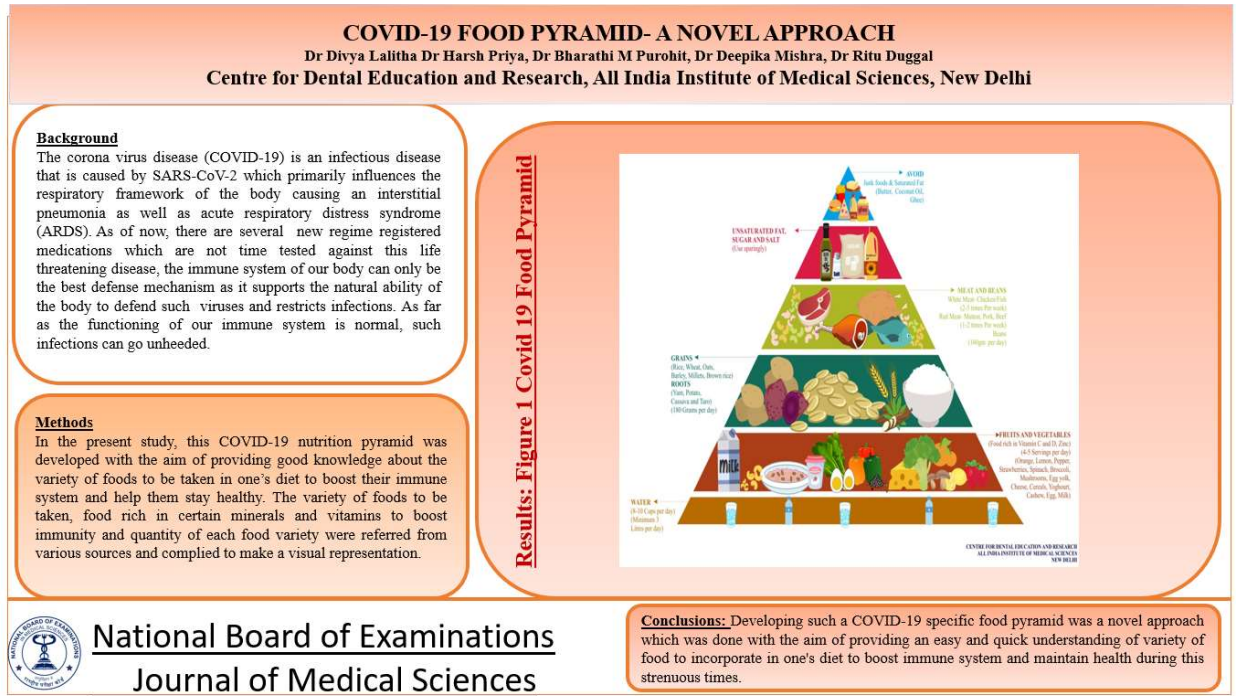
**Abstract**

COVID-19 is an infectious disease that is caused by SARS-CoV-2 which affects the respiratory framework of the body and continues to devastate the world's health as well as economy. This disease is said to adversely affect the nutritional status of the people. Healthy eating habits as well as lifestyle changes are essential to protect us from this virus. Now, there is a gradual increase in researches and nutritional recommendations on immunity boosting diets for COVID-19. However, there is still no such food pyramid has been specifically designed for COVID-19 period. Therefore, this study aimed to develop a COVID-19 specific food pyramid to illustrate the foods to be consumed on daily basis by a person to maintain health during this pandemic. Such visual representation of the nutritional guideline will help common people also to easily understand and adapt it to their day to day healthy eating behavior.

**Keywords:** COVID-19, Food Pyramid, Disease Control and Prevention (CDC)

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## Graphical Abstract



### COVID-19 and Nutrition

The corona virus disease (COVID-19) is an infectious disease that is caused by SARS-CoV-2 which primarily influences the respiratory framework of the body causing an interstitial pneumonia as well as acute respiratory distress syndrome (ARDS) [1]. As of now, there are several new regime registered medications which are not time tested against this life threatening disease, the immune system of our body can only be the best defense mechanism as it supports the natural ability of the body to defend such viruses and restricts infections. As far as the functioning of our immune system is normal, such infections can go unheeded [2].

This being a communicable disease, continues to devastate the world's health as well as economy. There is critical concern that this COVID-19 reactions adversely affect the nutritional status of the people [3].

It is progressively clear that nutritional considerations such as the identification of nutritional risk factors and use of additional nutrition support should become a basic part of management for COVID-19 [4]. Healthy eating habits as well as lifestyle changes are essential to protect us from the virus that is threatening our health. Maintaining a proper nutritional status is vital now, especially in such a period wherein the immune system might need to fight back to defend us [5].

### The USDA Food Pyramid

In 1992, based on the Dietary Guidelines put forward by the U.S. Department of Agriculture and the U.S. Department of Health and Human Services, a Food Guide Pyramid was developed [6]. The food pyramid was a visual representation of the recommended daily food intake for a

population. It was developed to depict the nutritional requirement in a population [7].

Now there is a gradual increase in researches and nutritional recommendations on immunity boosting diets for COVID-19. But still no such food pyramid has been specifically designed for COVID-19 yet. Such visual representation of the nutritional guideline will help common people also to easily understand and adapt it to their day to day healthy eating behavior. Therefore, this study aimed to develop a COVID-19 specific food pyramid to illustrate the foods to be consumed on daily basis by a person to maintain health during this pandemic.

Recent nutritional recommendations on COVID-19 by leading organizations were collected from the World Health Organization (WHO), the Centre for Disease Control and Prevention (CDC), Ayush.gov.in, Fao.org and nhs.uk to develop the COVID-19 specific food pyramid. We did a thorough web based review of all the national dietary guidelines for Covid-19 worldwide, using all openly available information. These included the dietary guidelines, its associated food pyramids and all other supporting documents, publications and general literature on this topic including scientific research papers as well as reports.

We mainly focused on official recommendations, wherein we also consider few 'quasi-official' recommendations also.

These are the recommendations which are developed and distributed by the institutions that are Government accredited but do not fall under any ministerial department. Their recommendations does not comprise any official policy. Additionally our analysis also included some guidelines given by academic as well as non-governmental organizations which are non-official but had good level of scientific evidences and also illustrate helpful and interesting approaches in integrating sustainable nutritional advices. We believe that the inclusion of these will be useful in the way that they highlight the growing academic and institutional interest in this issue. Visual representation and graphical designing of the compiled data in the form of pyramid to make it enthralling were performed in the present study finally to develop the Covid-19 specific food pyramid.

### **COVID-19 Specific Food Pyramid**

In the present study, this COVID-19 Nutrition Pyramid was developed with the aim of providing good knowledge about the variety of foods to be taken in one's diet to boost their immune system and help them stay healthy. The variety of foods to be taken, food rich in certain minerals and vitamins to boost immunity and quantity of each food variety were referred from various sources and complied to make a visual representation [8-15].

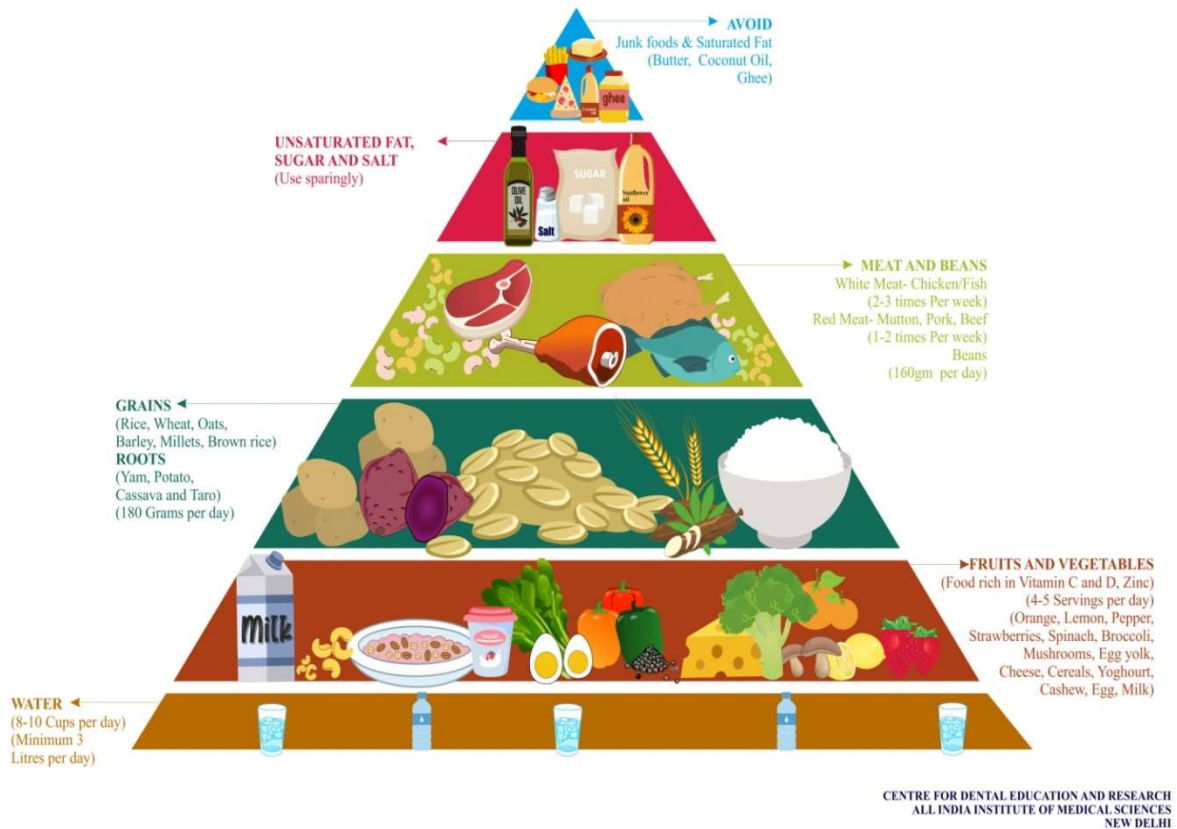


Figure 1. COVID-19 Food Pyramid

This pyramid explains the variety of foods to be taken with the quantity arranged in six shelves. This allows an individual to choose the preferred food variety from each shelf every day. The most important shelf starts from the bottom of the pyramid.

As already known, water is the basic component of life. The first shelf describes that it is necessary to drink minimum 3 liters of water per day to keep yourself well hydrated. As per WHO's recommendation for COVID-19, it is necessary to drink 8-10 cups of water every day [8].

The second shelf contains fruits and vegetables. It is necessary to incorporate foods rich in Vitamin C, D and Zinc during COVID-19 [10,11,14]. This helps to boost

the immune system of the body. The foods rich in Vitamin C, D and Zinc are Orange, Lemon, Pepper, Strawberries, Broccoli, Mushrooms, Egg yolk, Cheese, Tuna, Beef Liver, spinach, Cashew, Egg, Milk, Foods fortified with vitamin D such as Soy Milk, Cereals, Yoghurts. All these should be taken about 4-5 Servings per day in your diet [9,15].

The third shelf has grains such as Rice, Wheat, Oats, Barley, Millets, Brown rice or roots such as Yam, Potato, Cassava and Taro(180 Grams per day) in it [8,12]. All grains constitute the fiber rich foods that we have in everyday's diet for keeping our digestive system healthy.

The fourth shelf contains meat. It explains that white meat such as chicken and fish can be taken 2-3 times per week and red meat such as mutton, pork, beef can be taken 1-2 times per week in your diet. It is better to take white meat which are low in fat rather than red meat [8,12].

The fifth shelf describes unsaturated fat, sugar and salt which are to be used only sparingly. The top most sixth shelf explains that it is always better to avoid saturated fats and junk or processed food as they are nutrient less and are not needed for good health [8,12].

### **Changes in Food Pyramid in View of the Pandemic**

The USDA food pyramid consisted of bread, cereals, rice and pasta in the bottom most part of the shelf as they were important to be consumed as a part of healthy diet. Also, fruits and vegetables were placed in the shelf above it; whereas the COVID-19 food pyramid includes foods rich in Vitamin C, D and Zinc in the bottom shelf after water as they play an important role in nutritional requirement pertaining to COVID-19. Grains and roots are placed in the shelf above it as they provide the dietary fiber needed for the digestive system to stay healthy. Meat is placed in the shelf above it as in the US Food pyramid followed by unsaturated fat, sugar and salt which are to be used sparingly only. An extra shelf in the top of COVID-19 food pyramid has been added emphasizing on the fact that the intake of saturated fats and junk or processed food are always better to be avoided.

Prudent care was taken to consider all key factors into account while designing the

COVID-19 food pyramid to provide a nutritious meal pyramid for better health during COVID-19. The major limitation encountered was that the uniformity of measurements of variety of foods could not be maintained as the forms of foods were different in each shelf that is, water is mentioned in liters/cups, fruits and vegetables as servings and grains as grams.

Developing such a COVID-19 specific food pyramid was a novel approach which was done with the aim of providing an easy and quick understanding of variety of food to incorporate in one's diet to boost immune system and maintain health during this strenuous times. When medication or treatment is still being studied for this deadly virus, our immune system being our body's warrior, if kept healthy and functioning properly by eating proper nutritious food can combat and abate it.

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### **Conflict of interest**

Authors declare no conflict of interest

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### **Author Contribution**

All the above included authors have worked and have contributed equally in conducted and formulating this research.

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