

Fasten the Nutrients!! Flatten the Pandemic!! - Core Contribution of Medical Nutrition Therapy in COVID-19

V. Bhavani

Dietician, ESIC Medical College and Hospital, KK Nagar, Chennai

ABSTRACT

Currently the whole World in one perspective fighting against the new pandemic situation rose due to prevalence of Covid-19. Lot of researches is evolving about the role of Nutrition in Covid-19. Even though there is no consistent data supporting the direct role of Nutrition in Covid-19, there are many research across the world proved that many nutrients plays a vital role in betterment of the condition by improving the immunity. Nutrition is a science required for a healthy life. The present research paper explored about Medical Nutrition Therapy among Covid-19 patients and the role of various nutrients in boosting up the immunity and preventing the respiratory infections. Medical Nutrition Therapy is a branch of Life Science which helps in Patient Management. Nutritional assessment tools such as R-MAPP: Remote Malnutrition in Primary Practice and Eat-10 questionnaires are used among Covid-19 patients. Micro nutrients like Vitamin A, C, D, E, Selenium, Iron, Zinc are reported to act against respiratory Infections. These are immune Nutrients which is said to have anti viral properties. Consumption of these immune nutrients helps to protect from any respiratory infections. Proper hydration helps decrease nasal irritation when coughing, sneezing and even just breathing. Traditional foods are nature gift which are loaded with immense immune nutrients and supports the well being. Multi Vitamin Tablets can be consumed with the prescription of the physician. Meditation/ yoga/ Aerobics can be practiced regularly with sufficient sleep for 7 to 8 hours per day. The present study recommends "APP" to fight against this pandemic situation: A- Adequate Nutrition, P-Physical Activity, P-Proper Sleep. Well-balanced diet, periodic physical activity,

sufficient sleep, with good life style habits help in sound mind and healthy body leading to disease free life.

Keywords: COVID-19, Coronavirus, Nutrition, Medical Nutrition Therapy

INTRODUCTION

Adequate and appropriate nutrition is required for all cells to function optimally. This includes the cells in the immune system too. The immune system demands for energy and nutrients. This can be met from exogenous sources such as the diet, or from endogenous sources such as body stores. Some micronutrients and dietary components have very specific roles in the development and maintenance of an effective immune system throughout the life course or in reducing chronic inflammation. World Health Organization (WHO), 2020, states that "viral infections are one of the world's greatest public health challenges". The WHO guidance on diet, especially during the current pandemic states that "good nutrition is crucial for health, particularly in times when the immune system might need to fight back"¹. According to The European Journal of Clinical Nutrition, "Without adequate nutrition, the immune system is clearly deprived of the components needed to generate an effective immune response"². Good nutrition is thus important in supporting an optimum immune system which can reduce the risk of viral infections³. Nutrition care is vital, particularly in patients with COVID-19

infections. Nutritional status and nutritional care plays a very relevant role in defining both short- and long-term outcomes of Covid -19 patients.

NUTRITIONAL ASSESSMENTS DURING COVID 19

Lei Zhang, 2020 insisted that nutritional status of each covid -19 infected patient should be evaluated before the administration of general treatments⁴.

❖ **R MAAP:** is simple and rapid remote nutritional screening tool has been developed exclusively for this covid 19 pandemic. The acronym for the tool is R-MAPP, as for Remote – Malnutrition APP, while the tool is being developed as an app. Since the tool is designed for the family physicians in the conditions of remote patient care, it can also stand for Remote – Malnutrition in the Primary Practice. This tool is used as a combination of MUST and SARC-F. The First three steps used in ‘MUST’ to assess the risk of malnutrition which includes (a) body mass index (BMI), (b) unintentional weight loss, and (c) acute disease effect is evaluated. Secondly, to assess the loss of muscle mass and functions, SARC-F questionnaire can be used as a rapid diagnostic test for sarcopenia. This is based only on muscle contractile performance items such as strength, assistance with walking, rise from a chair, climb stairs and falls⁵. Based upon the nutritional scores, Nutrition care plan for the patients should be prescribed tailored made.

❖ **EAT-10:** questionnaire is an easy swallowing screening tool consisting of ten questions that could also be included in the remote evaluation of patients with dysphagia⁶

MACRO AND MICRO NUTRITIONAL REQUIREMENTS

Energy:

- 30 kcal per kg body weight per day for adults

- 27 kcal per kg body weight per day for adults above 65 years with polymorbid conditions
- 30 kcal per kg body weight per day for severely under nourished, polymorbid patients. Target should be reached cautiously and slowly due to high risk
- Non-intubated ICU patients: If the energy target is not reached with an oral diet, Oral Nutritional Supplement (ONS) should be considered first and then switch over to Enteral Nutrition (EN) treatment. If there are limitations for the enteral route it could be advised to prescribe peripheral Parenteral Nutrition (PN).
- Energy administration: hypocaloric nutrition, not exceeding 70 % of EE should be administered in the early phase of acute illness with increments up to 80-100% after day 3. If predictive equations are used to estimate the energy need, hypocaloric nutrition < 70 % estimated needs should be preferred over isocaloric nutrition for the first week of ICU stay.
- Intubated ICU patients : In ICU patients who do not tolerate full dose EN during the first week, initiate parenteral nutrition (PN)⁷

Protein:

- 1 g protein per kg body weight per day in older persons. This is individually adjusted with regard to Nutritional status, physical activity level, disease status and tolerance
- ≥ 1 g protein per kg body weight per day in polymorbid medical conditions. This is to prevent body weight loss, reduce the risk of complications and hospital readmission and improve functional outcome.
- Intubated ICU patients: During critical illness, 1.3 g per kg body weight of protein equivalents per day can be delivered progressively⁷.

Regular consumption of egg whites, milk and milk products, dhals, nuts whey

water helps to improve the protein consumption. Covid-19 patients on High protein liquid should be given milk, dhal water (well cooked, mashed and filtered dhal), whey water, nuts milk shake. Diseases specific Nutritional supplements can be recommended by Registered Dietician. Based on the General guidelines, the diet must be tailored made based on the co-morbid conditions.

Fat and carbohydrates: adapted to energy needs, fat-to-carbohydrate energy ratio 30:70 (no respiratory deficiency) to 50:50 percent (ventilated patients)⁷.

Non ICU patients and Non Covid conditions:

Sugars: WHO recommends that ideally only less than 5% of total energy intake for adults should come from free sugars (about 6 teaspoons). When other dessert options are chosen, ensure that they are low in sugar and consume small portions. In case of Diabetics, completely avoid sugary items such as sugar beverages, sweets, squashes, pastries, bakery foods.

Sodium: WHO recommends consuming less than 5 g of salt per day. In order to achieve this, prioritize foods with reduced or no added salt. Consider rinsing canned foods such as vegetables and beans, to remove some of the excess sodium. Add lemon juice and herbs to enhance taste and flavor. Avoid adding extra salt when cooking and to your meals at the table. Avoid consuming processed and preserved such as pickles, pappads.

Fiber: Dietary fiber is defined as “the portion of food derived from the plant cells, which is resistant to hydrolysis/ digestion by the elementary enzymes system in the human being”. It consists of hemicellulose, cellulose, lignin, oligosaccharides, pectin, gums, and waxes. Fiber contributes to a healthy digestive system and offers a prolonged feeling of fullness, which helps prevent overeating. To ensure an adequate fiber intake, aim to include vegetables, fruit, pulses and wholegrain foods, greens in all meals. Wholegrains foods include oats, brown pasta and rice, quinoa and whole-

wheat bread, millets such as ragi, barley, bajra rather than refined grain foods such as white pasta and white bread.

Fluids: Water is part of every cell in the body. When the body is sick with the flu or any type of virus, there are common symptoms that can lead to dehydration including fever, cough, diarrhea, vomiting and loss of appetite. When there is insufficient fluids, body may have difficulty in regulating the temperature. Even small fluid losses can contribute to increased body temperatures. Proper hydration helps decrease nasal irritation when coughing, sneezing and even just breathing.

Consumption of fluid is very essential. Consume fluids as buttermilk, clear soups, tender coconut water, rice water, barley water, dhal water, whey water, fresh juice without sugar, lemon juice with pinch of salt and pepper, herbal tea, ‘panagam’, a traditional South Indian liquid made with plain water, jaggery and few drops of lemon. Avoid drinking large amounts of strong coffee, strong tea and carbonated beverages. These may lead to dehydration and can negatively impact sleeping patterns. Sipping hot water regularly helps to soothe the throat.

Vitamin A: Vitamin A is also called “anti-infective”, and it acts against infection depend on an adequate supply. Semba et al had reported that vitamin A supplementation reduced morbidity and mortality in different infectious diseases, such as measles, diarrheal disease, measles-related pneumonia, human immunodeficiency virus (HIV) infection, and malaria⁸. Vitamin A is abundant in all colored vegetables and fruits like papaya, pumpkin, greens, oranges, tomato, carrot, mangos.

Vitamin C: Vitamin C is best known for its antioxidant properties and support healthy immune function. This vitamin is water soluble and cannot be stored in the body. The vital role of vitamin C involves in Iron absorption. It also benefits to increase WBC activity and platelets counts. That is the

reason we provide vitamin C rich foods during dengue. Vitamin C is also given during common cold. During infection, vitamin C levels can become depleted and a person's requirement for vitamin C increases with the severity of the infection⁹. An Indian study, conducted in Chennai city showed the deficient intake of Vitamin C consumption. It was observed that Vitamin C consumption was less than the recommended levels. The mean vitamin C intake was found to be 22 ± 3.3 milligrams in male and 24 ± 3.8 milligrams in female whereas the recommended value is 40 milligrams per day¹⁰. It is essential to meet the requirements to boost the immunity.

A meta-analysis of 18 controlled clinical trials with a more than 2000 patients to evaluate the effect of vitamin C on length of stay in the hospital ICU and the duration of mechanical ventilation was performed. In 12 of the trials reviewed, length of ICU stay was reduced by 7.8% in patients receiving vitamin C. In six trials, the length of ICU stay was reduced by 8.6% following oral administration of vitamin C in doses of 1–3 g/day. In three trials in which patients needed mechanical ventilation for over 24 hours vitamin C shortened the duration of mechanical ventilation by 18.2%¹¹.

A new Randomized clinical trial to test high-dose intravenous vitamin C (24g/ day for 7 days) in patients with COVID-19 has begun in Wuhan, China. They will assess requirements for mechanical ventilation and vasopressor drugs, organ failure scores, ICU length of stay and 28-day mortality⁹. The best sources of Vitamin C are amla, guava, orange, lemon, tomato, bell peppers, cabbage, sprouted grams, kiwi, greens.

Vitamin E: Vitamin E, a fat-soluble vitamin, is a potent antioxidant and has the ability to modulate host immune functions. Vitamin E deficiency is known to impair both humoral and cellular immunity. It has both anti viral and anti oxidant properties. Vitamin E helps to protect Immune cells. It acts against respiratory infections. Vitamin E is present in nuts, cooking oils, flax seeds.

Vitamin D: Vitamin D plays an essential role in the immune system. Vitamin D inhibits the production of pro-inflammatory cytokines and increases the production of anti-inflammatory cytokines. In the randomized trials and meta-analysis, vitamin D supplementation has been shown to have protective effects against respiratory tract infections; therefore, people who are at higher risk of vitamin D deficiency during this global pandemic should consider taking vitamin D supplements to maintain the circulating 25(OH)D in the optimal levels (75–125 nmol/L)¹². In Belgium, a retrospective observational study consisted of 186 positive cases and 2717 negative controls, reported a significant ($p = 0.0016$) low median of vitamin D in COVID-19 patients compared to the control subjects¹³. An Indonesian retrospective cohort study included 780 cases reported that older and male cases with pre-existing medical conditions and below-normal vitamin D levels are associated with higher odds of death¹⁴. A retrospective study in the mainland of USA included a large number of cases demonstrated that Sunlight and vitamin D, with latitude as an indicator, possibly associated with reduced risks for both COVID-19 cases and mortality¹⁵.

The abundant and nature gift of Vitamin D is sun rays. Exposure to sun rays between 11 am to 3 pm is recommended to get Vitamin D. The food rich in Vitamin D are egg yolk, fish oils, milk and milk product. Vitamin D fortified foods such as oil, wheat flour can be consumed.

Vitamin B12: One of the cohort study demonstrated the protective effects of combined vitamin D, Mg and vitamin B12 against clinical deterioration of COVID-19¹³

Zinc: Zinc plays a key role in the immune system. Severe zinc deficiency depresses immune function in the humans. The body requires zinc to develop and activate T-lymphocytes, which is a part of the immune system. According to the current estimates, the risk of zinc deficiency is observed in

more than 1.5 billion people in the world¹⁶. One of the Indian study showed that Zinc intakes were below 50% of the RDA level¹⁷. Zinc status is also tightly associated with risk factors for severe COVID-19 including ageing, immune deficiency, obesity, diabetes, and atherosclerosis, since these are known risk groups for zinc deficiency. Therefore, Zinc may possess protective effect as preventive and adjuvant therapy of COVID-19 through reducing inflammation, improvement of mucociliary clearance, prevention of ventilator-induced lung injury, modulation of antiviral and antibacterial immunity. The combination of zinc and pyrithione at low concentrations inhibits the replication of SARS coronavirus (SARS-CoV). Therefore, zinc supplement may have effect not only on COVID-19-related symptom like diarrhea and lower respiratory tract infection, but also on COVID-19 itself⁴. Zinc is loaded in almonds, walnuts, chick pea, lentils, pumpkin seeds, flax seeds, gingelly seeds, eggs, shell fish and whole grains.

Selenium: Selenium contains antiviral and anti oxidant property. Selenium prevents cell damage. Selenium is used in viral diseases like HIV and Covid 19. The lower the Selenium status in a population, the lower the recovery rate from COVID-19. In the city of Enshi, which has one the highest Selenium intakes in the world, the recovery rate from COVID-19 was almost triple the average for the rest of the cities in Hubei Province, including Wuhan. Selenium status may offer a protective benefit against the detrimental effects of the viral infection¹⁸.

Selenium deficiency was more severe in the samples obtained from non-survivors as compared with survivors of COVID-19 may suggest some relevance of the trace element for coping with the virus and for successful convalescence¹⁹. Selenium Deficiency is Associated with Mortality Risk from COVID-19. A European cross sectional study conducted among 1915 samples revealed that the Selenium status was significantly higher in samples from surviving COVID patients as

compared with non-survivors recovering with time in survivors while remaining low or even declining in non-survivors²⁰. In addition, selenium reduces the formation of thrombosis in the blood vessels. According to Fogarty, blood coagulation disorders leading to the formation of micro-clots are a significant cause of death in patients with COVID-19²¹. The best sources of selenium from food are Brazil nuts, seafoods, garlic, oats, seeds, liver, meat and whole grains.

Iron : Iron is an essential mineral which plays a key role in the making of healthy red blood corpuscles. Iron deficiency anemia is not only common in developing countries, but it can also be seen in developed countries. It is the most common micronutrient deficiency worldwide. It exceeds 50% in developing countries and is usually attributed to inadequate nutrition. Unfortunately, the majority of the female population had intakes below the RDA for iron in India. Its deficiency affects the capacity to have an adequate immune response. The role of iron in immunity is necessary for immune cell proliferation²². Some authors indicate that a mild/moderate iron deficiency may have a protective effect on respiratory infections²³. It is also indicated a 2-5.7 fold increase in the incidence of acute lower respiratory tract infections in patients with iron deficiency anemia²⁴. Iron deficiency has been reported as a risk factor for the development of recurrent acute respiratory tract infections⁴. Thus to enhance the immunity among the population, it is necessary to consume Iron rich foods and store the iron which acts against the respiratory infections. The iron sources in the food are Greens especially cauliflower leaves contains 40mg/ 100gm can be consumed regularly along with lime juice to correct iron deficiency. Dry sundaikai, bajra, roasted bengal gram, liver, rice flakes, mint, soya, lotus stem are sources of iron.

Omega: Omega-3 and Omega-6 PUFAs predominantly promote anti-inflammatory and pro-inflammatory effects⁴. The impact of dietary polyunsaturated fatty acids

(PUFAs) on the immune system has been investigated for decades, with special focus on the omega-3 PUFAs α -linolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA). ALA is found in nuts and seeds whereas EPA and DHA are the main components of fish oil. Both omega-3 and omega-6-derived metabolites have important immune-regulatory functions²⁵. EPA and DHA supplementation can alter many biological pathways which may have direct influence in the outcome of COVID-19²⁶. The food sources are fatty fish like salmon, mackerel, anchovies,

sardines, arctic char and trout., eggs (including omega-3 enriched) , flaxseeds and flaxseed oil, walnuts, soybeans, tofu, canola oil, chia seeds.

IMMUNE BOOSTING FOODS

Traditional foods have been proven to be essential in human life by improving the immunity in daily basis not only for flavor and taste; but also for medicinal properties as they contain various health promoting compounds. Traditional foods help to boost the immunity. The below mentioned foods can be consumed regularly

Food	Compound	Dosage recommended
Black pepper	Phenolic amides, flavonoids	No specific dose
Ginger	Gingerol	0.25 to 1g, 3 to 4 times a day
Turmeric	Curcumin	400 to 600 mg, 1 to 3 times a day
Star Anise	Anethol, fennel	A pinch
Fresh Garlic	Allicin	2 to 5 grams
Kolaj seeds	Thymoquinone	2 grams
Fenugreek	Saponins, flavonoids	5 grams
Coconut oil	Lauric acid	Only 4 teaspoon of any oil is recommended per day
Lemon	Limonene	No specific dosage
Sweet potato	Carotene and Anthocyanin	No specific dosage
Drumstick leaves	Beta carotene	No specific dosage

- ❖ **Immune boosting Drink:** prepared by boiling turmeric, ginger, pepper, lemon, star anise, lemon, mint in water can be consumed daily to boost the immunity.
- ❖ Milk with pepper and turmeric can be consumed daily.

PHYSICAL ACTIVITY

Physical activity can be defined as “any bodily movement produced by skeletal muscles that require expenditure”. Physical inactivity or being sedentary is a fourth leading risk factor for global mortality and is a major contributing factor for various non-communicable diseases such as diabetes mellitus, cancer and heart diseases²⁷ (Roshini Rajappan, 2015). WHO reported that around 60% of the global population does not regularly meet the recommended daily minimum physical activity.

In the current Pandemic, since most of them are at home and quarantined, there is more chance of physical inactivity which at the end leads to obesity and other non-communicable Diseases. This may add on

the additional burden to the health condition and intervention programs. The Centers of Disease Control (CDC) recommends at least thirty minutes of moderate physical activity or brisk walking at least for five days in a week for adults (one hundred and fifty minutes of moderate-intensity physical activity per week). Author suggests various physical activities in this pandemic: yoga, gardening, aerobics can be performed daily. Walking in the terrace garden or jogging within the campus is recommended. Meditation can be performed as a mode of relaxation. This helps to enhance the physical and mental health.

CONCLUSION

Nutrition is a science required for a healthy life. World is facing a pandemic situation, where food and nutrition plays a vital role in boosting the immunity of the population and also helps in the intervention. As per the guidelines of WHO and Nutritional societies, it is advised to avoid processed foods, foods with chemical preservatives and excess salt. Consumption

of coloured vegetables and fruits (atleast 400 grams per day) are enriched with all essential micro nutrients which is needed to boost the immunity. Regular meal timing with consuming locally, freshly, seasonal foods are recommended. Multi Vitamin Tablets can be consumed with the prescription of the physician. Meditation/ yoga/ Aerobics can be practiced regularly with sufficient sleep for 7 to 8 hours per day. Concluding the study, to boost the immunity in this current pandemic, the author recommends to follow the “APP”, which means A- Adequate Nutrition, P-Physical Activity, P-Proper Sleep. Following this APP, regularly, ensure good health and keep us away from many disease conditions. Well-balanced diet, periodic physical activity, sufficient sleep, with good life style habits help in sound mind and healthy body leading to happy life. As per the words of Hippocrates “If we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have the safest way to health.”

REFERENCES

1. World Health Organization (2020) *WHO launches new global influenza strategy* [Online] Available at: <https://www.who.int/news-room/detail/11-03-2019-who-launches-new-global-influenza-strategy>
2. Marcos A., Nova, E., Montero A . Changes in the immune system are conditioned by nutrition. *Eur J Clinical Nutrition* . 2003, 57, S66–S69
3. Beck MA., Levander OA . Host Nutritional Status and Its Effect on a Viral Pathogen *The Journal of Infectious Diseases*, 2002. Volume 182 (1): S93–S9
4. Lei Zhang., Yunjui Liu. Potential interventions for novel coronavirus in China: A systematic review *J Medical Virology*, 2020, 92 (5): 479-490.
5. Zeliko Krznaric., Darija Vranesic Bender., Alessandro Laviano., Rosario Montero . A simple remote nutritional screening tool and practical guidance for nutritional care in primary practice during the covid -19 pandemic, *Clinical Nutrition*, 2020 , 39 (7)
6. Belafsk PC., Mouadeb, DA et al., Validity and Reliability of the Eating Assessment Tool (EAT-10). *Ann Otol Rhinol Laryngol*, 2008, 117(12) 919-24
7. Rocca Barazzoni., Stephen C Bischott., Joao Breda . ESPEN Expert statements and practical guidance for Nutritional Management of individuals with SARS-COV2 infection. *Clinical Nutrition*, 2020, 39(6): 1631-1638.
8. Semba. Vitamin A and immunity to viral, bacterial and protozoan infections. *Proceedings of the Nutrition Society*, 1999, 58: 719-727
9. Carr AC, Rosengrave PC, Bayer S, Chambers S, Mehrtens J, Shaw GM. Hypovitaminosis C and vitamin C deficiency in critically ill patients despite recommended enteral and parenteral intakes. *Crit Care*. 2017, 21:300
10. Bhavani V., Prabhavathy Devi N , Assment of Macro Nutrients and Micro Nutrients Intake of Collage Age Population: A Population Based Study. *Shanlax International Journal of Science and Humanities*. 2020, Vol 3: 97-103.
11. Hemila H, Chalker E. Vitamin C can shorten the length of stay in the ICU: a meta-analysis. *Nutrients*. 2019, 11: 1–30
12. Nurshad Ali. Role of vitamin D in preventing of Covid-19 infection, progression and severity. *J. Infect Public Health*, 2020.
13. De Smet D., De Smet K., Herroelen P., Gryspeerdt S., Martens G.A. Vitamin D deficiency as risk factor for severe COVID-19: a convergence of two pandemics . *Infect Dis*, 2020.
14. Petre Cristian Illie Y, Li Q, Zhang N, Liu Z. Sunlight and vitamin D in the prevention of coronavirus disease (COVID-19) infection and mortality in the United States , *Ageing Clin Exp Resp*, 2020, 6: 1-4.
15. Raharusun P., Priambada S., Budiarti C., Agung E., Budi C. Patterns of COVID-19 mortality and vitamin D: an Indonesian study. *SSRN J*. 2020
16. Anatoly Skanly et al ., Zinc and respiratory tract infections: Perspectives for Covid-19. *International Journal of Molecular Medicine* . 2020.
17. Margaret P Rayman, Ramy Saad, Kate Bennett, Ethan Will Taylor, Jinsong Zhang. Association between regional selenium status and reported outcome of

- COVID-19 cases in China. *The American Journal of Clinical Nutrition*, 2020
18. Schomburg., Selenium deficiency is associated with mortality risk from Covid-19. *Nutrients*. 2020.
 19. Arash Moghaddam , Raban Arved Heller, Qian Sun , Julian Seelig , Asan Cherkezov, Linda Seibert 1, Julian Hackler 3, Petra Seemann 3, Joachim Diegmann 1, Maximilian Pilz 4, Manuel Bachmann 1, Waldemar B. Minich 3 and Lutz Schomburg, *Nutrients* , 2020, 12, 2098
 20. Fogarty H., Townsend L., Ni Cheallaigh C., Bergin C., Martin-Loeches I., Browne P. COVID-19 Coagulopathy in caucasian patients. *Br J Haematol*. 2020
 21. Mascotti, DP, Rup D, Thach RE. Regulation of iron metabolism: translational effects mediated by iron, heme and cytokines. *Annu Rev Nutr* 1995;15:239–61.
 22. Wander K, Shell-Duncan B, Brindle E. Lower incidence of respiratory infections among iron-deficient children in Kilimanjaro, Tanzania. *Evol Med Public Health*. 2017;2017(1):109–119.
 23. Rashad MM, Fayed SM, El-Hag AK. Iron-deficiency anemia as a risk factor for pneumonia in children. *Benha Med J*. 2015;32:96–100
 24. Saray Gutierrez et al., Effect of omega 3 fatty acids on immune cells. *International Journal of Molecular Sciences* 20(20): 5028
 25. Zoltan Szabo., Tamas Marosvalgyi. (2020). The Potential Beneficial Effect of EPA and DHA Supplementation Managing Cytokine Storm in Coronavirus Disease, 2020. *International Journal of Molecular Science* 20 (20): 5028
 26. Roshini Rajappan., Karthikeyan Selvaganapathy., Lol Lew., (2015). Physical activity level among university students: a cross sectional survey. *International Journal of Physiotherapy and Research*, 3(6):1336-43.
- How to cite this article: Bhavani V. Fasten the nutrients!! flatten the pandemic!! - core contribution of medical nutrition therapy in COVID-19. *Gal Int J Health Sci Res*. 2020; 5(3): 30-37.
