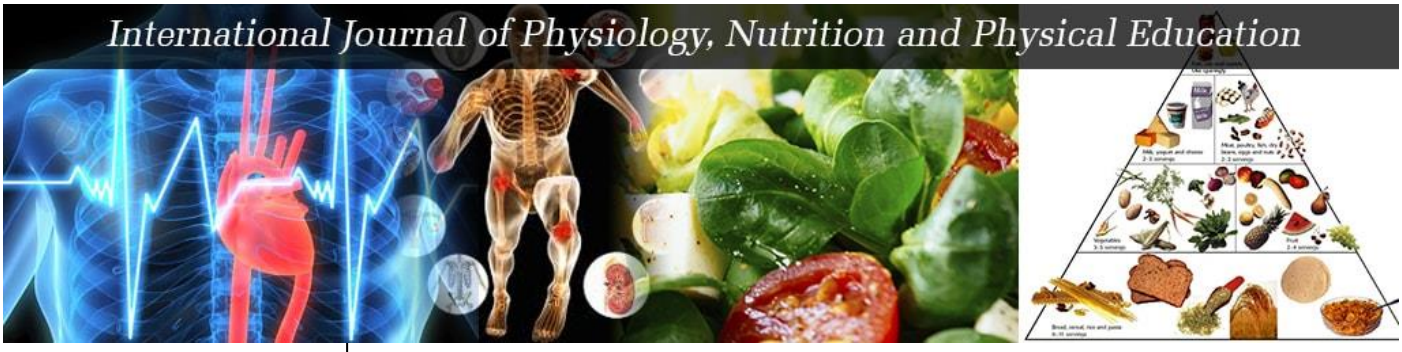

ISSN: 2456-0057
IJPNPE 2021; 6(2): 09-13

www.journalofsports.com
Received: 07-05-2021
Accepted: 09-06-2021

Monoj Maiti
State Aided College Teacher (SACT), Department of Physiology, Bajkul Milani Mahavidyalaya, Bajkul, Purba Medinipur, West Bengal, India

Corresponding Author:
Monoj Maiti
State Aided College Teacher (SACT), Department of Physiology, Bajkul Milani Mahavidyalaya, Bajkul, Purba Medinipur, West Bengal, India

Role of nutrients in immunity development of human with prevention of COVID – 19 and special reference to physical exercise and yoga in Indian population

Monoj Maiti

Abstract
Nutrients include organic and inorganic substances of food responsible for proper growth and functions of body e.g. proximal principle of food (carbohydrates, proteins and fats) and protective principle of food (Vitamins, minerals). Nutrients has a major role in development of immunity that is protective power against antigen or immunogenic such as bacteria, virus, parasites etc. The innate immunity developed before birth but acquired immunity developed after birth whiles the microbes entering into blood stream there different nutrients e.g. vitamins, minerals, proteins has most important role. The COVID – 19 is a rapidly communicable infectious respiratory disease noted first in Wuhan city, Hubei Province, China on 31th December 2019. The pandemic condition by COVID – 19 is prevented in the year 2020 and 2021 by lockdown and maintaining the health roles such as use of mask, hand sanitizer and shop, maintain of social distance, intake of immunity enhancing food, yoga, vaccination etc. The citreous food e.g. grapefruits, oranges, Clementine, tangerines, lemons, limes etc, red bell peppers, broccoli, garlic, ginger, spinach, yogurt, almonds, sunflowers seeds, turmeric, green tea, papaya, kiwi, poultry etc more powerful nutrients and also forms protective power against microbes. The daily intake of food stuffs or feeding behaviors differs in different countries. There are so many foods are immunity enhancing but Indian people's like the list of food stuffs with immunity enriched as well as COVID – 19 disease preventive has lack of data. The anti-oxidant vitamins present in foods helpful for treatment of COVID – 19. The vaccines develop for increase immunity against COVID – 19. The physical exercise has too many effects in life that are also for healthy life and heard immunity and maintain normal body Wight with plasma sugar, lipoproteins level with reduces risk of cardiac and respiratory diseases. The article deals with the nutrients in list of intake of foods of Indian Peoples Which are responsible for treatment of COVID – 19 cases with also acts as immunity enhancement and the physical exercise and yoga also play role in healthy life in human beings.

Keywords: nutrients, immunity, COVID – 19, physical exercise, yoga

Introduction
The most important basal element of a living organism include human is food which contain nutrients such as carbohydrates, proteins, lipids, vitamins, minerals and water is essential for proper growth and nutrition of body. The nutrients includes energy providing and disease preventive (Mandy Ferreira, 2020) [1]. The carbohydrates foods provide glucose, fructose and galactose, proteins foods provide amino acids, peptone, peptide etc and fat foods provide fatty acids, triglycerides, glycerol, cholesterol, choline etc. The odidation in cellular palce is also noted that give high energy (ATP) and end product is carbon-di-oxide (CO_2) that is excreted through lungs, due to cellular aerobic oxidation in large extension, free radicals is formed which contain unpaired electrons in extra orbital e.g. hydroxyl radical ($HO^{\cdot}$), triplet oxygen (:CH) etc, the free radicals caused of aging of cells, tumor formation in different organs of body etc harmful effects are noted, the activity of the radicals is noted by antioxidant which are present in beta-carotene, lutein, lycopene, selenium and vitamin A, C and E, yet vantioxidant sometimes harmful for large amount of use (Medline Plus Trusted Health information for you, 2021) [2]. The antioxidant with vitamin and minerals enriched food stuffs also accelerates the immunity. The COVID -1 9 or coronavirus disease -19 is a infectious respiratory disease that cause of novel coronavirus, first patient of the COVID -19 was noted in Changsha, China.

The infections rate is very rapidly occurs in whole world, death date id gradually increase and for suppress the infections and morbidity rate WHO declare the pandemic and lockdown in different countries. The record up to seventh July 2021 COVID – 19 positive cases 30,670,494, recovered 29,799,534 and death 404,341 in India (worldometer, 2021) [3]. The lockdown from 24th March 2020 access the close of transport system, educational places, production house, shopping mole, market place etc, there is only active some food and medicine caring transport, there is active medical services only. The margent labours which are works in others countries or state as a labors or contract basis workers etc come returns in their home and they depressed due to localized in quarantine center or isolation center and other cause due to loss of their job and suffering with lack of food and accommodations. The health censuses due to lockdown is increased in peoples by police, administrator, NGOs, electronics media, social media etc that also is utilized in prevention of COVID -19 such as there is stay save at home, use of mouth mask in outdoor, use of hand sanitizer, use of shop for washed your hands, keep social distance in outdoor place, intake of fresh vegetables, fruits, eggs, milk, fish etc, regular physical exercise and Yoga etc also important factors. The pandemic situation by COVID – 19 is suppressed as well as stopped by maintain lockdown in 2020. There is all vehicles except emergency medicine car, vegetables and important food carrying cars are stops there is no fuel for energy utilization as heat or energy is loss, there is close of all company or production houses in the time that inhibit the pollution e.g. nose, water, air etc. There is merits and demerits of environmental changes in lockdown condition, the merits also helpful for human population as well as total ecosystem are include reduces the GHGs emission, reduce water pollutant, reduce air pollutant, reduce the wastes formation from different chemical company etc that also helpful for healthy life but the demerits are also found such as increase the medical different wastes e.g. infected mask in road sites and footpaths, gloves, disposal PPE that may cause of infections in other persons in alternative ways (Tanjena Rume, 2020) [4].

Nutrients with Immunity

The nutrients which require for providing energy, proper growth, repair and maintain chemical processes in body. The basal factors for life are food, clothes and accommodation. The food contain the 6 elements such as carbohydrates, proteins, fats (oils), vitamins, minerals and water (Australian Government Department of Health, 2013) [5]. The carbohydrates are the molecule that contain carbon, hydrogen and oxygen atoms in a specific ratio, its chemical structure is $(CH_2O)_n$, the sources of its in foods e.g. rice, bread, milk, potatoes, popcorn, soft drinks, oats, buckwheat, bananas, grapefruits, apples etc. The most important energy source is carbohydrate include glucose in body which provide 4.1K.cal/ grams of it another importance are stores energy as glycogen in liver that provide glucose / ATP in emergency, suppress the constipation and digestive tract disease, dilatory fibers as well as indigestible carbohydrate decrease the risk of diabetics and also reduce the level of bad cholesterol etc (Keith Pearson, 2017) [6]. The proteins are large molecules, present in foods are beef, lamb, veal, chicken, turkey, duck, emu, goose, scallops, clams, eggs, fish, milk, cheese etc. The proteins provide essential and non essential amino acids, energy 4.0K.Cal/ grams of proteins, also helpful for growth and repair the tissues, the enzymes which are protein also regulate the biochemical reactions or pathways, proteins also acts as carrier transport another bio-molecules in blood stream, maintain blood pH (average 7.4), proteins form antibody that protect antigen or immunogen and develop the immunity (Gavin Van De Walle, 2018) [7]. The nutrient protein that acts as immunity protein is powerful inhibitors for treatment against bacterial toxins (C. Kleanthous *et al*, 2001) [8]. The deficiency of protein and energy in children signify the different symptoms include kwashiorkor, marasmus, marasmic kwashiorkor etc (Wikipedia the free encyclopedia, 2021) [9]. The good source of fat in body is olive oil, nuts, seeds, avocados, fatty fish etc, the fat provides energy 9.3K.Cal/grams, stores as adipose tissue beneath the skin and mucous membrane help for maintain body temperature and energy in emergency, provide essential fatty acids (EFA) and non essential fatty acids (NEFA), supply the fat soluble vitamins like A, D, E and K (Harvard Health Publishing Harvard Medical School, 2021) [10]. The carbohydrates, proteins and fats are the macronutrients which is also called proximal principle of food. The protective principle of foods is vitamins, minerals and water. The vitamins are the substance enters into body through different food particles, on solubility bases there are two types are fat soluble and water soluble vitamins. The amount of daily requirement of vitamin is very low in body but essential for proper growth and protection against diseases, prevent the different diseases. The major types of vitamin A, D, E, K, C, P and B (thiamine, riboflavin, niacin, pantothenic acid, biotin, folate etc) each has specific some functions (Medline Plus Trusted Health information for you, 2021) [11]. The impotence of vitamin A or retinol in immune system and reproductive system and activity found in heart, lung, kidney and other organs. The vitamin A has major source in milk, fat, eggs, liver, beta-carotene, fruits etc, the daily requirement in body varies with age and sex e.g. adult men 900mg RAE (micrograms Retinal Activity Equivalents), adult women 700mcg RAE and during pregnancy its requirement is high 750mcg RAE (National Institutes of Health Office of Dietary Supplements, 2021) [12]. The vitamin-A has protective role in immunity; protect night blindness, infertility, respiratory infections, delayed body growth etc. The vitamin A deficiency characterized by blindness, skin issues, pregnancy complications etc. The daily requirement of the vitamin in men and women is 900mcg and 700mcg per day respectively. Vitamin C or ascorbic acid is a water soluble vitamin, daily requirement of its in adults men and women is 90mg and 75 mg respectively, has an important role in normal growth and development of all tissues of the body. The unwanted metabolism forms the free radicals or reactive oxygen species (ROS) that are harmful for body also may forms cancer, heart disease, aging etc. These radicals activity can be damaged or inactivate by antioxidant, here vitamin-C has important role as an antioxidant, so the vitamin-C enriched food such as citrus food, peppers, strawberries, broccoli, potatoes etc also require for reduce the risk of diseases as well as development of immunity (Medline Plus Trusted health information for you, 2021) [13]. The fat soluble vitamin-E (Tocopherol) acts as antioxidant like vitamin C, its important sources are nuts, seed, vegetables, fruits, sunflowers, safflower, soybean oil, almonds, red bell pepper, mango, avocado etc, daily requirements in adults men 15mg, women 15mg, pregnant women 15mg, lactating mother 19mg., it is an powerful protestant against microbes, reduce the risk of cancer in different roans, scientific studies shows it is important in treatment of high blood pressure, heart attack, chest pain, asthma, respiratory disease, infertility, allergies

etc, prevent the aging of skin etc, in deficiency of the vitamin symptoms dysarthria, myopathy, retinopathy, haemolytic anemia, toxicity etc are noted (netmeds.com India ki pharmacy, 2019) [14]. Vitamin-D (ergocalciferiol- D2, cholecalciferol-D3, alfacalcidol) is a fat soluble vitamin, present in food stuffs salmon, mackerel, egg yolks, cheese. Beef liver, moshrooms, fortified milk, fortified cereals and juices etc. The vitamin-D helps for development of bone, teeth and due to deficiency of the vitamin rackets in children and osteomalasia and osteoporosis in adults and old aged persons is noted respectively. The minerals include micro and macro types which are require for proper nutrition and also has protective role in prevention of disease. The macro minerals such as calcium, phosphorus, magnesium, sodium, potassium, chloride etc and micro minerals are called trace minerals such as iron, manganese, copper, iodine, zinc, cobalt, selenium etc, each elements has significant in maintain of physiological process. The sources, daily requirement, importance of minerals are representing in below table no. 01. The different has protective role in prevention of different disease with maintain normal body growth, here mineral and vitamin also play in protection of disease so these are protective principle of foods. The COVID – 19 due to infection of corona virus in lung while immunity is strong there infection is not noted. In protective principle of food, water is very important which helps in temperature regulation of body, acts as lubricants and cushions in joints etc. The zinc enriched food or zinc tablets also has merits in treatment of COVID -19 yet there is no enough data above the mater but it is proved the long term use of zinc capsule also harmful characterized by hematological defects, anemis, leucopenia, myelopathy, ataxia etc. The zinc and hydroxychloroquine application also has decrease rate of mortality with COVID – 19 patients (NIH, 2021) [15].

Table 1: Sources, Daily Requirement and Importance of Minerals

Name of Mineral	Sources	Daily Requirement for adults men and women	Importance
Calcium	Milk, cheese, green leafy vegetables, soya drinks, bread etc.	700mg/day	Helps in muscle contraction, blood coagulation process, neural signal transmission, acts as co-enzyme, etc.
Magnesium	Greens, nuts, dry beans, whole grains, wheat, oat bran etc.	400mg/day	Regulate muscle, nerves activity, blood sugar level, blood pressure etc.
Sodium	Breads, rolls, pizza, sandwiches, soups, chicken etc.	3400mg/day	Acts as electrolytes and minerals, helps in muscle and nerve activity, significantly in blood and lymph fluid (85%) etc.
Potassium	Banana, beans, beef, beets, raw, cooked etc.	3500-4700mg/day	Helps regular heart beats and remove the waste product from the cells etc.
Chloride	Table salt, sea salt, vegetables, rye, tomatoes, lettuce, celery, olives etc.	2300mg/day	Acts as important electrolytes in blood, maintain normal blood volume, blood pressure and blood flow, blood pH etc.
Iron	Red meats, pork, poultry, sea foods, beans, raisins, spinaches, peas, dried fruits etc.	8.7 – 50mg/day	Important for formation of hemoglobin and myoglobin, helps in oxygen transport in body, prevent anemia etc.
Iodine	Cod and tuna fish, seaweeds, shrimp, dairy products such as milk, cheese, yogurt etc.	140microgram/day	Responsible for thyroid hormone synthesis, maintain BMR, metabolism, size of thyroid gland, maintain normal body temperature and brain development etc.
Zinc	Red meats, poultries, chickpeas, nuts, baked beans etc.	8 – 11mg/day	Develop the immunity, helps in cell division, cell growth, wound healing, carbohydrates metabolism etc.
Selenium	Brazil nuts, seafood, muscle meats, cereals etc.	55micrograms/day	Helps in cognition, immunity development and fertility etc.

Immunity with Covid – 19

The immunity is protection power against antigen or microbes; there are two types of immunity e.g. innate immunity and acquired immunity. The innate immunity or in born type of immunity, developed from born e.g. skin, mucous membrane, gastric acid etc on the other hand, the acquired immunity developed after birth by entering the antigen into blood stream. The acquired immunity is formed by T and B lymphocytes, where macrophage, dendrite cells, antigen presenting cells is important. The T lymphocytes mediate the cell mediated immunity (CMI) and B lymphocyte, mediate the humeral immunity. The vaccination also performed the antibody formation against the particular type of antigen and forms the strong immunity in body. The T lymphocyte differentiates into the CD $^{4+}$ and CD $^{8+}$ types. The CD $^{4+}$ is called helper T cell (THC) and the CD $^{8+}$ is called cytotoxic T cell (CTLs). The CD $^{4+}$ link with phagocytes with microbes, there is T cell receptor and MHC has important role in the interaction, cytokine secretion is noted that result activation of macrophage, killing of ingested microbes and inflammation thus this type of T cell is acting. The CD $^{4+}$ cell attach with infected cell with microbes in cytoplasm and killing of infected cell and thus forms the immunity (N. V. Bhagavan, 2021) [16]. The specific antibody formation against specific antigen is noted, the interaction between them results the agglutination, precipitation, opsonization, and immobilization of antigen is noted, in this way the humeral immunity is developed. The antibody or immunoglobulin (Ig) is a glycoprotein formed from B lymphocytes. The antibody has 4 peptide chains and in the structure of Ig fragment antigen binding (Fab) and fragment Crystallizable (Fc) region and in between hinge region is present. The verities of antibody with their importance in immunity shows table no. 02 (kyowa kirin, therapeutic antibodies) [17].

Table 2: Name, Molecular Weight, Location, Importance of Antibody

Name of Antibody	Molecular Weight (Daltons)	Location or Present in	Importance
IgG	150,000	Blood, Tissue, ECF.	Protect the fetal and formed immunity in body against the antigen; protect the infection of body tissues.
IgM	900,000	Blood	Forms initial immunity against viral, bacterial, parasites infections etc.
IgD	180,000	Surface of B cell	Activates the B cells.
IgE	200,000	Blood	Surveillance mechanism for the immune system and pollinosis.
IgA	385,000	Serum, Breast Milk, Saliva	Protect GI tract infection of newborns against bacterial and viral infection, forms first line defenses in body.

The COVID – 19 suppress the formation of angiotensin II in alveolar cells that affects the normal functions of it. The product angiotensin II responsible for vasoconstriction in pulmonary circulatory system as well as decrease the blood circulation, stimulate the sympathetic nerve, increase the aldosterone synthesis. The aldosterone effects in kidney for the reabsorption of water and sodium chloride. Due to infections by coronavirus in alveolar cells, there is collapse of alveoli, gaseous exchange suppress, intake of oxygen in blood is suppressed that increase the breathing rate, increase the interval of breathing, depth of breathing increase, energy for proceeding the breathing is increase, pulmonary edema etc are noted. The fever, fatigue, dry cough, loss of appetite, body aches, shortness of breath, mucus or phlegm, sore throat, headache, chills, loss of smell, congestion, nausea, diarrhea etc are noted after entering 2 – 14 days of the virus in respiratory symptoms (Web MD, 2021) [18]. The best immunity against the SARS-CoV-2 virus via vaccination, intake of vitamin and minerals enriched food intake regularly, there is specific antibody formation is noted via COVID vaccination and antibody formation is increased by intake of nutrients respectively. The COVAXIN is the first COVID – 19 vaccine developed by Bharat Biotech and in collaboration with the Indian Council of Medical Research (ICMR), the vaccine contain dead virus which is unable infects the persons but can able to stimulate the immune system (Bharat Biotech, 2021) [19]. The vaccine is Covishield, developed by University of Oxford and British-Swedish pharmaceutical company Astra Zeneca. The table no. 03 shows about two popular vaccines.

Table 3: Name of Vaccine, Developed by, Composition and Side Effects (ET Online, 2021) [20].

Name of Vaccine	Developed by	Composition	Side effects	
			Immediate	Delayed
Covishield	University of Oxford and British-Swedish pharmaceutical company Astra Zeneca	Inactivated adenovirus with segment of coronavirus, aluminium hydroxide Gel, L-Histidine, L-Histidine hydrochloride monohydrate, Magnesium chloride hexahydrate, polysorbate 80, Ethanol, Sucrose, Sodium Chloride and EDTA.	Injection site pain, headache, fatigue, chills, nausea etc.	Rare event of demyelination disorders.
COVAXIN	Bharat Biotech and in collaboration with the Indian Council of Medical Research (ICMR)	Inactivated coronavirus, aluminum hydroxide Gel, TLR 7/8 agonist, 2-Phenoxyethanol and Phosphate Buffered Saline (NKA1).	Injection site pain, headace, fatigue, fever, body ache, injection site swelling etc.	No effects till now.

The suppress of infections of COVID – 19 was declared by the world health organization, there is more deals with eating habits e.g. the intake of fresh food regularly which are notorious e.g. fruits, vegetables, lentils, beans, nuts, whole grains, oats, wheat, brown rice, milk, meat, fish, eggs etc. daily intake of enough water (8-10 cups water/ day), eat moderate amount of fat, avoid more salt and sugar intake etc which also increase the immunity as well as COVID-19 infection is preventable (WHO, 2021) [21].

Physical Exercise and Yoga with Covid – 19

The physical exercise also accelerates the prevention of different disease in human. The risk of heart attack, coronary heart disease, diabetes mellitus, arteriosclerosis etc is decreased due to regularly exercise. The regular exercise in static or dynamic state also provides the flowing changes in body such as enlargement of heart size, increase the numbers of capillaries so that gaseous exchange is more powerful, blood circulation is more in and smooth in systematic circulatory pathway, rate of heart rate, stroke volume, cardiac output is increase, increase the number of RBC, the activity of respiratory muscles both inspiratory and expiratory muscles and diaphragm is increase, rate of respiration is decrease, tidal volume (TV), vital capacity (VC), inspiratory reserve volume (IRV) etc is increase, decrease the recovery time, increase the physical fitness index (PFI) etc. The cession of the exercise that result the subject become to normal like before the exercise. During the period of exercise the release of neurotransmitter norepibephrin (NE) from brain cells has ability to better feeling in mind. For the regular exercise the blood flow in the blood vessels is normal and pressure is also normally maintain, maintain normal body weight etc also helpful for healthy life and also preventive the COVID - 19 infection (WHO, 2021)[22]. The evidence shows that the physical exercise which is aerobic, strength, flexibility, balance exercise type is required for isolated or confinement COVID – 19 patients for better (Patricia Polero *et al*, 2020) [23]. The term Yoga comes from Sanskrit word ‘yuj’ that means that means to connect, join and balance. Yoga or ‘Yujyate anena iti yogahaa’, it is also called union between the limited self and the divine self. In structure of Yoga, there are following branches include Jnana Yoga, Karma Yoga, Bhakti Yoga, Raja Yoga and Hatha Yoga (Parmarth Niketan, 2021) [24]. The Yoga originated in India before thousands year, it is one type of exercise involving the breathing techniques that forms better health. Like the exercise or alternative medicine for better life, Yoga has similar advancement effects in life such as it responsible for weight loss, it improves the immunity of body that is most important point due to prevention of infections by coronavirus, it helps for relief stress and anxiety, it increases muscle strength and flexibility (Medindia Content Team, 2019) [25]. The hormone

melatonin produced and release from pineal gland of middle part of the brain, this hormone helps in sleep and also acts as anti-inflammatory, anti-viral, antioxidant, anti-infectious and immune-enhancing in body. The experimental report shows that longer term practice of Yoga has significant secretion of melatonin while in short term practice of it decreases the melatonin secretion. Due to pandemic by COVID – 19, the Yoga practice also helpful for increase the immunity with relief of psychological problems e.g. depressed mood, anxiety etc (Sarah McEwen, 2021) [26]. The nitric oxide or oxides of nitrogen is a colorless gas, free radical acts as signaling molecule in physiological process such as increase immunity, vascular relaxation, neurotransmission, apoptosis etc. Humming which is low pitch Bhramari that result 15 fold increases the nasal nitric oxide than quite exhalation. The effects of NO or nitric oxide has potent effects in defense mechanism against viruses and parasitic organism as well as protective power against the antigen (yogabharati, 2020) [27].

Conclusion

The best medicine for several diseases is regular physical exercise and intake of fresh vegetables, fruits, milk, egg, and fish etc which are more notorious for healthy life. The Yoga also give the better life with specially increase the respiratory capability that is necessary for maintain normal cardiovascular and respiratory activity. The COVID – 19 due to infection of coronavirus in respiratory system of human suppress the gaseous exchange in alveolar bed and ventilation of the system that interfere the oxygen supply in blood as well as in all tissues of body. The strongly immunity is developed through dilatory management and physical exercise with Yoga on the other hand environmental suppressed pollution is better for competition against the coronavirus, there is infections rate is very low and recover easily noted.

Declaration

This paper is original and not published anywhere.

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