



WEEKLY EPIDEMIOLOGICAL REPORT

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Nutrition in pandemic situations

Proper nutrition is complementary to drug therapy and vaccines, in enhancing the immune system, which protects us against infections. In addressing COVID-19, nutritional status is very important as it plays a crucial role in the functioning of the immune system. The infection affects an individual adversely by generating status of undernutrition. Anorexia, nausea, vomiting and diarrhoea during the infection leads to insufficient intake of food thereby, nutrients. But, the importance of nutrition in pandemic situations is less discussed.

Reduced intake of energy causes undernutrition, reduced intake of protein causes sarcopenia and reduced intake of micronutrients cause micronutrient deficiencies. Nausea, vomiting and diarrhoea during the infection cause hypermetabolism and excess nitrogen loss. This mechanism increases pro-inflammatory cytokines and was evident in COVID-19 patients. The presence of chronic diseases among the patients negatively affects the nutritional status of the individual. Thus, the elderly population is more prone to be undernourished than the other age groups. Other than the medical conditions, socioeconomic factors like employment status, poverty and physical status like frailty can negatively affect the nutritional status. The major cause of undernutrition worldwide is the unavailability of adequate food leading to starvation. Inappropriate diet due to various reasons leading to loss of muscle mass, bone mass, increased circulatory toxins and fatty acids, which are associated with

early mortality. Undernutrition causes more morbidity, prolonged hospital stays, delay in recovery and increased mortality.

Fresh and unprocessed food provides proteins, vitamins, minerals, dietary fiber and antioxidants which are necessary for the optimal level of functionality of the immune system.

According to the Food-Based Dietary Guidelines, a variety of food in sufficient serving sizes should be consumed to fulfil the individual nutritional requirement. Dietary pattern was identified as the most important factor in determining an individual's nutritional status. It is directly related to the occurrence of non-communicable diseases and the development of other macronutrient and micronutrient deficiencies. The dietary pattern has been described in various ways in the literature according to the various regions of the world and cultural issues causing comparison difficulties across studies. Dietary diversity is the number of food groups consumed by an individual during a specific period. Minor differences can be seen in the food groups used to calculate the dietary diversity score in the literature. The main food groups commonly used are starchy foods, vegetables, fruits, meat/fish/eggs or alternative, legumes/lentils and milk/dairy products. Although all the food groups are consumed, it is necessary to get the minimum requirement from each food group for the optimum nutritional status of the body. This concept is called dietary serving sizes. Recommended servings were calculated by referring to the Food-Based Die-

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tary Guidelines for Sri Lankans.

Individual nutritional requirement depends on the age, gender, physiological status (pregnancy and lactation) or the level of physical activity. The effect of nutrition on the immune system is widely explored. Protein is essential to produce immunoglobulins against pathogens. Proteins with high biological value (e.g.: eggs, lean meat, fish, dairy) contain all the essential amino acids such as Arginine and Glutamine, which can exert an anti-inflammatory effect and modulate the immune system.

Omega 3 fatty acids like Eicosatetraenoic acid (EPA) and Docosahexaenoic acid (DHA) can inactivate enveloped viruses by modulating the optimal host lipid condition for viral replication. EPA and DHA inhibit cyclooxygenase enzyme (COX) and suppress pro-inflammatory prostaglandin production. Polar lipids such as phospholipids, glycolipids or sphingolipids exert an anti-inflammatory effect by blocking platelet activation factor (PAF). Among the micronutrients, vitamin D plays an important role in modulating the immune system. Research evidence available on the deficiency of vitamin D is associated with increased incidence and mortality due to COVID-19 infection. Vitamin A also has an immunomodulatory activity in humans and animals. Vitamin A can be found in both animal (retinol) and plant (carotenoids) sources. Vitamin C possesses an antioxidant role and helps to reduce morbidity and mortality in pandemic situations. Folate (vitamin B9) plays an important role in generating immune response and antibody production in infectious disease conditions. Folate and vitamin B should be considered in the treatment of COVID-19 infection to reduce complications.

Among micronutrients, minerals like Zinc, Iron, Selenium and Copper help in the proper operation of the immune system. Zinc influences the antioxidant activity of some proteins. Also, acts as anti-inflammatory compounds in optimizing the immune response and reducing the risk of infections in pandemic situations.

Other than macronutrients and micronutrients, the fiber present in the food plays a vital role in controlling the glycemic level in the blood, more useful in patients with diabetes mellitus and in controlling overweight. According to the Food-based Dietary Guidelines in Sri Lanka, drinking plenty of clean and safe water is essential for the optimum function of the systems in the body. The general recommendation is to intake 1.5 liters of water per day.

Other than the above measures, healthy dietary habits are also essential in achieving an optimal nutritional status. Reduced consumption of sugar, salt and unhealthy fats, drinking plenty

of clean safe water, reduce consumption of processed food are some healthy dietary habits. Healthy lifestyle behaviors also play an important role in maintaining and supporting immune functioning. These include physical exercise, avoiding alcohol and tobacco and adequate sleep etc.

Proper dietary hygienic measures must be practiced to minimize the risk of contamination of food with microbes and other harmful substances to the human body. Contamination can happen at the place of transportation, storage, preparation and serving. Adhering to hygienic food safety measures can lower the risk of contamination. Washing of food before consumption, proper cleaning of utensils, storing cooked and uncooked food separately are some of these hygienic measures.

Suboptimal status of nutrition level is observed despite adequate dietary intake in some individuals. Many factors are affecting the bio-availability of immune-related micronutrients. Genetic variants, environmental conditions like pollution and anti-nutrient interactions among food are some of them. Optimizing the nutritional condition of the community/individual can be considered both as a primary and secondary prevention strategy in pandemic situations like COVID-19.

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Table 1: Selected notifiable diseases reported by Medical Officers of Health 16th - 22nd Jan 2021 (4th Week)

| RDHS | Dengue Fever | | Dysentery | | Encephaliti | | Enteric Fever | | Food Poi- | | Leptospirosis | | Typhus Fe- | | Viral Hep- | | Human | | Chickenpox | | Meningitis | | Leishmania- | | WRCD | |
|------------------|--------------|-------------|-----------|-----------|-------------|----------|---------------|-----------|-----------|----------|---------------|------------|------------|------------|------------|-----------|----------|----------|------------|-----------|------------|-----------|-------------|------------|-----------|-----------|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | T* | C** |
| Colombo | 26 | 106 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 14 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 3 | 1 | 2 | 0 | 0 | 56 | 95 |
| Gampaha | 18 | 74 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 20 | 82 |
| Kalutara | 17 | 70 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 8 | 0 | 0 | 0 | 0 | 30 | 100 |
| Kandy | 13 | 50 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 6 | 36 | 3 | 7 | 1 | 1 | 0 | 0 | 1 | 5 | 0 | 1 | 1 | 5 | 59 | 100 |
| Matale | 3 | 11 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 9 | 0 | 3 | 0 | 1 | 0 | 0 | 2 | 3 | 0 | 1 | 5 | 19 | 73 | 100 |
| NuwaraEliya | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 3 | 10 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 31 | 100 |
| Galle | 3 | 17 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 14 | 73 | 2 | 6 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 1 | 41 | 100 |
| Hambantota | 5 | 15 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 8 | 18 | 0 | 5 | 0 | 4 | 0 | 0 | 0 | 2 | 3 | 4 | 26 | 51 | 75 | 100 |
| Matarata | 6 | 25 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 9 | 25 | 1 | 3 | 0 | 0 | 0 | 0 | 1 | 7 | 0 | 0 | 16 | 25 | 28 | 100 |
| Jaffna | 13 | 32 | 5 | 10 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 5 | 41 | 124 | 0 | 0 | 0 | 0 | 2 | 3 | 1 | 1 | 0 | 0 | 13 | 88 |
| Kilinochchi | 2 | 7 | 1 | 3 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 11 | 5 | 13 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 63 | 100 |
| Mannar | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 7 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 31 | 80 |
| Vavuniya | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 19 | 100 |
| Mullaitivu | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 4 | 100 |
| Batticaloa | 249 | 895 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 55 | 100 |
| Ampara | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 12 | 0 | 1 | 0 | 0 | 57 | 100 |
| Trincomalee | 4 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 31 | 100 |
| Kurunegala | 16 | 55 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 13 | 57 | 2 | 6 | 0 | 0 | 0 | 0 | 3 | 6 | 3 | 22 | 20 | 43 | 46 | 100 |
| Puttalam | 9 | 37 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 8 | 0 | 1 | 49 | 98 |
| Anuradhapur | 2 | 10 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 38 | 3 | 12 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 5 | 3 | 40 | 33 | 96 |
| Polonnaruwa | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 15 | 31 | 38 | 100 |
| Badulla | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 29 | 0 | 6 | 0 | 1 | 0 | 0 | 3 | 4 | 0 | 0 | 1 | 4 | 52 | 97 |
| Monaragala | 3 | 5 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 11 | 0 | 3 | 1 | 4 | 0 | 0 | 2 | 3 | 1 | 2 | 1 | 3 | 0 | 100 |
| Ratnapura | 13 | 24 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 72 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 7 | 5 | 13 | 4 | 8 | 34 | 100 |
| Kegalle | 4 | 19 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 25 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 11 | 1 | 2 | 0 | 0 | 43 | 100 |
| Kalmune | 8 | 27 | 0 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 100 |
| SRI LANKA | 421 | 1514 | 14 | 37 | 2 | 7 | 2 | 10 | 3 | 4 | 111 | 496 | 63 | 206 | 3 | 14 | 0 | 0 | 35 | 95 | 19 | 81 | 92 | 233 | 42 | 97 |

Source: Weekly Returns of Communicable Diseases (esurveillance.epid.gov.lk).

*T= Timeliness refers to returns received on or before 22nd January, 2021 Total number of reporting units 357 Number of reporting units data provided for the current week: 352 C**=Completeness

Table 2: Vaccine-Preventable Diseases & AFP

16th – 22nd Jan 2021 (4th Week)

| Disease | No. of Cases by Province | | | | | | | | | Number of cases during current week in 2021 | Number of cases during same week in 2020 | Total number of cases to date in 2021 | Total number of cases to date in 2020 | Difference between the number of cases to date in 2021 & 2020 |
|-----------------------|--------------------------|----|----|----|----|----|----|----|-----|---|--|---------------------------------------|---------------------------------------|---|
| | W | C | S | N | E | NW | NC | U | Sab | | | | | |
| AFP* | 01 | 00 | 00 | 00 | 00 | 01 | 00 | 00 | 00 | 02 | 01 | 04 | 03 | 33.3% |
| Diphtheria | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 0% |
| Mumps | 00 | 01 | 00 | 00 | 00 | 00 | 00 | 00 | 01 | 02 | 02 | 06 | 05 | 20% |
| Measles | 00 | 00 | 00 | 00 | 00 | 00 | 01 | 00 | 00 | 01 | 01 | 03 | 02 | 50% |
| Rubella | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 0% |
| CRS** | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 0% |
| Tetanus | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 01 | -100% |
| Neonatal Tetanus | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 0% |
| Japanese Encephalitis | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 01 | 00 | 02 | -100% |
| Whooping Cough | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 0% |
| Tuberculosis | 121 | 08 | 35 | 03 | 05 | 22 | 02 | 00 | 21 | 217 | 168 | 522 | 485 | 7.62% |

Key to Table 1 & 2

Provinces: W: Western, C: Central, S: Southern, N: North, E: East, NC: North Central, NW: North Western, U: Uva, Sab: Sabaragamuwa.
RDHS Divisions: CB: Colombo, GM: Gampaha, KL: Kalutara, KD: Kandy, ML: Matale, NE: Nuwara Eliya, GL: Galle, HB: Hambantota, MT: Matara, JF: Jaffna, KN: Killinochchi, MN: Mannar, VA: Vavuniya, MU: Mullaitivu, BT: Batticaloa, AM: Ampara, TR: Trincomalee, KM: Kalmunai, KR: Kurunegala, PU: Puttalam, AP: Anuradhapura, PO: Polonnaruwa, BD: Badulla, MO: Moneragala, RP: Ratnapura, KG: Kegalle.

Data Sources:
Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,
Special Surveillance: AFP* (Acute Flaccid Paralysis), Japanese Encephalitis
CRS** =Congenital Rubella Syndrome
NA = Not Available

Number of Malaria Cases Up to End of January 2021,

0

All are Imported!!!

Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to chepid@slt.net.lk. **Prior approval should be obtained from the Epidemiology Unit before publishing data in this publication**

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