IMPORTANCE OF FOOD AND NUTRITION TO BOOST THE IMMUNE SYSTEM

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Abstract: Nutrition plays an important role in everyday life of a person. A healthy nutritious diet promotes growth of body, helps in maintaining healthy body weight, promotes healthy pregnancy outcomes, and reduces risk of chronic diseases. Opposite of that who doesn’t take nutritious food in diet may have to suffer from various physical and mental disorders. There are main six nutrients that should be present in diet i.e Proteins, Carbohydrates, Fats, Vitamins, Minerals, and Water. The deficiency of these nutrients in diet causes disorders such as kwashiorkor, beri-beri, coronary heart disease, night blindness, marasmus, reproductive disorders etc. A healthy nutritious diet improves the immunity of person so that one cannot usually suffers from diseases. Some of the important foods that improves the immunity of the person are mentioned below. One should know about these foods and nutrition so that the people will not have to face the problem of malnutrition that includes both undernutrition and overweight. In Ayurveda it is mentioned that intake of shadrasatmak ahari(six tastes of food) is important and also the ahar should be taken in proper time and proper quantity due to this the person gets prevented to suffers from disease.

Keywords: Nutrition, nutrients, deficiency, immunity

INTRODUCTION

Health is nothing but absence of disease. The foods that we eat and the nutrients that they provide, are the important environmental factors that are influencing our development, growth, functional abilities and health. Our lifestyle with health habit disciplines, proper nutrition, and exercise programming these will have a great influence on personal health. This nutritious diets helps the person from preventing them from disorders such as cancer, stroke, heart disease etc. The deficiency of nutrients in diet weakens the immunity of person so that the people get affected by diseases. To increase the immunity of people one should take nutritious diet also according to Ayurveda proper diet at proper time and dosage is very essential also one should include shadrasatmaka ahara (i.e madhura(sweet), aamla(sour), lavan(salty), katu ( pungent), tikta(bitter), kashaya(astringent) in diet as this help to keep the people away from from diseases.

Nutrition

Nutrition is nothing but the combination of processes due to which every living organism receives & uses the food materials that is necessary for growth, maintenance of functions & repair of component parts.¹

OBJECTIVES OF NUTRITION

• To promote physical and mental growth of human being
• To provide energy
• To protect human beings from deficiency disorders and infections.
• Repairing tissues and cells which damaged by injuries or infections.²

PROXIMATE PRINCIPLES OF FOOD³

1. Proteins
2. Carbohydrates
3. Fats
4. Vitamins
5. Minerals
6. Water

CARBOHYDRATE

FUNCTIONS:

• It is the major component of food as a main source of energy.
• Production of energy in the body
• Useful bacterial growth
• Vitamin B complex synthesis
• Prevention of constipation
SOURCES
- **Starch:** roots, tubers, cereals
- **Sugars:** glucose, honey, white sugars
- **Cellulose:** indigestible contributes to dietary fibers

DAILY REQUIREMENTS
- **Children:** 60-250 grams
- **Adolescents:** 400 grams
- **Men:** 300-700 grams
- **Women:** 240-600 grams

PROTEINS

FUNCTIONS
- For all body parts such as muscle, brain, blood, skin, hair, nails, bones and body fluids it is the building material.
- Regulates haemoglobin
- Regulates muscle contraction, produces digestive juices and antibodies, enzyme formation
- For the growth of all body cells eg. Skin and bones.
- The repair of worn out or damaged cells eg. Cuts.

SOURCES
- **Animal food** - Milk, eggs, meat, fish, paneer, curd
- **Vegetables food** – pulses, cereals, beans, nuts, oil seeds

DAILY REQUIREMENTS
- **Infants < 6 months:** 2gm/day
- **Infants 6-12 months:** 1.50 gm/day
- **Child:** 21-40gm/day
- **Man:** 60gm/day
- **Woman:** 50gm/day

FATS

FUNCTIONS
- It provides energy: 1gm of fat provides nearly about 9 calories of energy
- Maintain body temperature.
- It provides support for many organs in our body such as kidneys, heart, intestine etc.

SOURCES
- **Vegetable sources:** ginger oil, mustard oil, groundnut oil and coconut oil
- **Animal sources:** fat of meat, ghee, butter, fish oils

Daily requirements
- **Man:** 20-60 gm
- **Woman:** 20-40 gm

VITAMINS

VITAMIN A

**Functions of vit .A**
- It acts as anti-infective agent.
- Essential for skeletal growth of human beings.
- It is an important nutrient for normal vision especially in the dark
- Rebuilding of glandular and epithelial tissue

Requirements: needs 600 of retinol or 2400 of β-carotene.

VITAMIN D

**FUNCTIONS**
- Prevents from rickets in childrens
- Promotes bones dissolution
- Promotes intestinal absorption of phosphorus and calcium
Sources
- Foods: found only in food of animal origin: butter, cheese, liver, egg yolk
- Sunlight: ultraviolet rays of sunlight

**Daily requirements:**
Adult : 2.5 mcg

**VITAMIN E**

**FUNCTIONS**
- It acts as an antioxidant and reduces oxidation of unsaturated fatty acids.
- Maintain stability of cell membranes
- After external application it minimizes wrinkles, scars, scratch marks.

**SOURCES**
- Dark green leafy vegetables, whole grain, nuts, legumes, vegetable oils, hydrogenated fats.

**Daily requirements:**
Adults: 10 mg

**VITAMIN K**

**FUNCTIONS**
- Stimulates production of coagulation factors.
- Essential vit for the formation of prothrombin.
- It acts as the catalyst for the activating the enzyme.
- Synthesize the required protein for the human body.

**Daily requirements**
0.03 mg /kg wt for adults.

**Sources:**
Dark green leafy vegetables, cauliflower, cabbage, cow milk, liver

**VITAMIN C**

**FUNCTIONS**
- Helps to increase general resistance of the body to fight infections.
- It involves in absorption, distribution, mobilization, and intoxication of metal ions.
- Protects lungs and eyes from oxidizing agents.
- Helps transfer of iron from plasma into tissues.

**Sources:**
- Green leafy vegetables
- Cabbage, tomatoes
- all citrus fruits
- germinating legumes liver and kidney

**Daily requirements:**
40 mg/day for adult

**VITAMIN B1 (THIAMINE)**

**Functions:**
- It is essential for the proper functioning of the nervous system.
- Plays an important part in carbohydrate metabolism

**Sources:**
- Cereals, pulses and nuts.

**Daily requirements:** 1-2 mg per day or 0.5mg per 1000 kcal of energy intake.

**VITAMIN B2 (RIBOFLAVIN)**

**FUNCTIONS**
- Protein, carbohydrate and fat metabolism.
- Helps in oxidation of fatty acids and transport H.

**SOURCES**
- Milk and milk products, liver, grean leafy vegetables
- Wheat, pulses

**Daily requirement** – 1-2 mg
VITAMIN B3 (NIACIN)

**FUNCTION:**
- Essential for normal function of skin, gastrointestinal and nervous system.
- Controls blood cholesterol and lipids.
- Helps in synthesis of DNA and its repairment.

**SOURCES:**
- Cereals, pulces, nuts, meat, groundnuts, liver and chicken

**Daily requirements:**
- 20 mg per day

VITAMIN B6 (PYRIDOXINE)

- metabolizes amino acids, carbohydrate, fats

**Daily requirements:**
- 1.5-2 mg per day

**Sources:**
- Liver, fish, meat, legumes, cereals

VITAMIN B12 (CYNOCOBALAMINE)

- metabolizes carbohydrate, protein, fats
- Makes RBC
- Synthesizes DNA and fatty acids

**SOURCES:**
- Eggs, fish, milk, liver

**Daily requirements:**
- 1 microgram for adult

MINERALS

- It forms part of structure of body tissues such as nails, teeths, nerves and muscles.
- They protect the body against infections.
- They are vital to mental and physical development.

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphorus</td>
<td>Mineralization of teeths and bones</td>
</tr>
<tr>
<td>Calcium</td>
<td>Mineralization of teeths and bones, regulates blood pressure and immune defence</td>
</tr>
<tr>
<td>Chloride</td>
<td>Maintains electrolyte balance and normal fluid</td>
</tr>
<tr>
<td>Sodium</td>
<td>Maintains electrolyte balance and normal fluid</td>
</tr>
<tr>
<td>Zinc</td>
<td>Essential for development, immunity and reproduction</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Involved in formation of bone</td>
</tr>
<tr>
<td>Copper</td>
<td>Essential for haemoglobin formation</td>
</tr>
</tbody>
</table>

Table No. 1 FUNCTION OF MINERALS

<table>
<thead>
<tr>
<th>NUTRIENTS</th>
<th>DEFICIENCY DISEASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>CARBOHYDRATE</td>
<td>• Ketosis, fatigue,</td>
</tr>
<tr>
<td>PROTEINS</td>
<td>• Kwashiorkar</td>
</tr>
<tr>
<td></td>
<td>• Marasmus</td>
</tr>
<tr>
<td></td>
<td>• Marasmic kwashiorkor</td>
</tr>
<tr>
<td>VITAMINS</td>
<td>• Conjunctival Xerosis</td>
</tr>
<tr>
<td>a. VITAMIN A</td>
<td>• Night blindness</td>
</tr>
<tr>
<td></td>
<td>• Corneal xerosis</td>
</tr>
<tr>
<td></td>
<td>• Bitot’s spots</td>
</tr>
<tr>
<td></td>
<td>• Keratomalacia</td>
</tr>
<tr>
<td></td>
<td>• Corneal ulcer</td>
</tr>
<tr>
<td>b. VITAMIN D</td>
<td>• Rickets</td>
</tr>
<tr>
<td></td>
<td>• Osteomalacia</td>
</tr>
<tr>
<td></td>
<td>• Decrease phosphorus and calcium in the blood</td>
</tr>
<tr>
<td></td>
<td>• Low deposition of calcium phosphate in the growing bones.</td>
</tr>
<tr>
<td>c. VITAMIN E</td>
<td>• Loss of reflexes, muscle weakness.</td>
</tr>
<tr>
<td></td>
<td>• Associated with habitual abortions.</td>
</tr>
<tr>
<td></td>
<td>• Presence of hemolytic anemia.</td>
</tr>
</tbody>
</table>
d. **VITAMIN K**  
- Increased risk of haemorrhage among premature or in the new born babies with complicated labour.  
- Haemorrhage, bleeding disorders.

e. **VITAMIN C**  
- Conjuctival haemorrhag,  
- Scurvy  
- Bleeding of gums and petechiae of skin  
- Frequent diarrhea, fever, vomiting

f. **VITAMIN B1 (THIAMINE)**  
- Beri-Beri

g. **VITAMIN B2 (RIBOFLAVIN)**  
- Scaly dermatitis, confined skin, glossitis, keratitis, circumcorneal vascularization

h. **VITAMIN B3 (NIACIN)**  
- Diarrhea, gastrointestinal disorder, nausea, vomiting, loss of memory, cracks of hand and neck.

i. **VITAMIN B6 (PYRIDOXINE)**  
- Convulsions, abdominal distress, loss of weight.

j. **VITAMIN B12 (CYNOCOBALAMINE)**  
- Megaloblastic anaemia Formiation of immaturd RBCs causing anaemia

**MINERALS**

a. **Calcium**  
- Osteomalacia, Osteoporosis

b. **Copper**  
- Bone abnormalities

c. **Magnesium**  
- Convulsion, tetany

d. **Phosphorus**  
- Bone pain, muscular weakness

e. **Zinc**  
- Decreased immunity, growth failure

f. **Iron**  
- Anemia, fatigue

**Importance of nutrition**
- Good nutrition improves well being  
- Helps in managing healthy weight  
- maintains immune system  
- Delays effects of aging  
- Gives energy  
- Reduces the risk of chronic disease  
- Increases focus  
- Lengthen life[6]

**FOODS THAT BOOST THE IMMUNE SYSTEM[7],[8]**
The following foods boost the immune system

<table>
<thead>
<tr>
<th>Foods</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turmeric</td>
<td>Curcumin present in turmeric improves person’s immune response</td>
</tr>
<tr>
<td>Sweet potatoes</td>
<td>It is rich in beta carotene, a type of antioxidant</td>
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<tr>
<td></td>
<td>It helps to make healthy skin and protects from UV rays.</td>
</tr>
<tr>
<td>Spinach</td>
<td>It boost the immune system containing essential antioxidant and nutrientis</td>
</tr>
<tr>
<td></td>
<td>including vitamin E, vitamin C, carotenoids, flavonoids.</td>
</tr>
<tr>
<td></td>
<td>Vit C &amp; E support immune system.</td>
</tr>
<tr>
<td>Ginger</td>
<td>Ginger has it’s antioxidative and anti-inflammatory properties.</td>
</tr>
<tr>
<td>Garlic</td>
<td>It prevents cold and other illness.</td>
</tr>
<tr>
<td></td>
<td>It has immune boosting properties</td>
</tr>
<tr>
<td>Sunflower seeds</td>
<td>It is rich source of vit E</td>
</tr>
<tr>
<td></td>
<td>Vit E improves the immune function</td>
</tr>
<tr>
<td></td>
<td>It has antioxidant properties.</td>
</tr>
<tr>
<td>Almonds</td>
<td>They are rich source of vit. E and also contain magnesium, manganese and</td>
</tr>
<tr>
<td></td>
<td>fiber</td>
</tr>
<tr>
<td>Oranges</td>
<td>Rich source of vit. C</td>
</tr>
<tr>
<td></td>
<td>It improves the human immune system</td>
</tr>
<tr>
<td>Yogurts</td>
<td>It is a rich source of vit. D</td>
</tr>
<tr>
<td></td>
<td>It helps to regulate the immune system</td>
</tr>
</tbody>
</table>
AYURVEDIC CONCEPT

➢ Every individual has to take healthy and proper dosage of food. The person who by controlling indriyas take healthy food at proper time that person never suffers from any disease. The opposite of that who doesn’t have control over food has to suffer from various diseases.[9]

According to Acharya charka diet should include all the six rasas madhur, amla, lavan katu, tikta, kashaya that is useful in balvardhana (to increase energy) whereas intake of single rasas causes balhaani (weakness).[10]

➢ Acharya vagbhat said that in every season all the six rasa diet intake is necessary and the also rasas according to the season.[11]

➢ Ahar rasas and Dhatu relation[12]

- Madhur (sweet) - raktadhatu vardhan
- Amla aahar (sour) - majja dhatu vardhan
- Lavan aahara (salty) - asthi dhatu vardhan
- Tikta aahara (bitter) - meda dhatu vardhan
- Katu aahara (pungent) - mamsa dhatu vardhan
- Kashaya aahara (astringent) - rasa dhatu vardhan
- All the six rasas - shukra dhatu vardhan

DISCUSSION

In Modern era due to modern lifestyle people have tendency to intake junk diets instead of nutritious food. Due to lack of this nutritious diets people have to suffer from dangerous hazards. Proper nutritious diets helps in normal growth, development, promotes healthy pregnancy, maintain healthy body weight and also it reduces the risk of chronic diseases. In ancient time also Acharya sushruta explained that every individual has to take healthy and proper dosage of food. The person who by controlling indriyas take healthy food in proper time that person never suffers from any disease. The opposite of that who doesn’t have control over food has to suffer from various diseases.

CONCLUSION

According to both ancient and modern views the intake of nutritious food in diet is very essential. Lack of these nutrients in diets may suffer the people from various disorders such as heart diseases, reproductive disorders etc. Also in ancient time it was describe that proper diet in proper time is very much essential and in diet shadrasatmak ahar i.e madhura, amla, lavana, katu, tikta, kashaya (sweet, sour, salty, pungent, bitter, astringent) all these six rasas (tastes) should be present in diet due to this persons will get prevented to suffer from diseases.

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