DIET THERAPY 1

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Unit 2

- Nutrition during infancy
- Nutrition during preschool children
- Nutrition during school age

NUTRITION DURING INFANCY

Growth and development during infancy

- According to WHO, the average weight of healthy newborn baby is 3.2 kg and normal length is 50-55 cm at birth.
- The child has 75% water and 12 to 15 percent fat by the end of one year.
- Water decreases to 60% and fat increases by 24%.
- Infants have Rapid heart rate 120-140 bpm and hemoglobin level 17 to 20 gm per 100 ml of blood.

Energy

- Infants require 92-kilo calorie per kg body weight.
- 50% energy intake is used for basal energy, 25% for physical activity and 25% for growth.
- After 6 months infant should feed with supplement food like (milk, cooked vegetables and fruits).
- To meet the energy requirements excess intake of calorie may leads to infantile child obesity.

Protein

- Protein intake for infant is about 1.16 gm per kg body weight.
- It need for skeletal muscle growth.
- Mother’s milk provides all amino acids for proper growth.
- Deficiency of calories and protein leads to protein energy malnutrition that is marasmus and kwashiorkor.

Fat

- Fat intake for infant is about 19 gm. Deficiency of fats develops skin lesions, diarrhoea and poor growth.

Calcium and phosphorus

- Infants requires 500 mg of calcium and 750 mg of phosphorus.
- Calcium and phosphorus is needed for proper bone development calcium: Phosphorus ratio in mothers milk is 2 :1 and in Cow's milk 1 : 2

Zinc

- Mother's milk contains high level of zinc.
- It promotes normal growth and needs for normal brain development.

Sodium

- Mother’s milk contains good level of sodium.

Iodine

- if mother is deficient in Iodine it will make the infants mentally retarded.

Vitamin A

- needed for proper vision. Infants requires 400 microgm as daily requirement.

Vitamin D

- needed for calcium absorption it prevents rickets.

Vitamin K

- Deficiency of Vitamin K lead to haemorrhage

Vitamin C

- Infants requires 25 mg as daily requirements.
- If Vitamin C is less in mother's milk the infants may develop Scurvy.

Folic acid

- Infant requires 25 microgm as daily requirement.
- Folic acid is needed for synthesis of RNA and DNA.
- Also Folic acid is essential for the development of RBC.

Advantages of breastfeeding

- The advantages of breastfeeding can be considered under nutritional, immunological, psychological, economical and physiological and other factors.

Nutritional benefits

- It contains high amount of lactose
- It contains salivary amylase that helps in digesting starch.
- It contains 20% beta casein and 80% whey protein.

- It contains binding proteins it contains EPA and D H A.
- It contains 2 : 1 ratio of calcium and phosphorus
- It contains 1: 5 ratio of Copper and zinc
- It contains more amount of Vitamin A and B

Hormones and growth factor benefits

- It contains hormones like TSH, thyroxin, parathyroid hormone, calcitonin, oxytoxin, growth hormone, insulin, prolactin
- It contains growth regulating factor growth promoting factor growth modulators

Immunological benefits

- Macrophages destroys bacteria
- Lymphocytes -these for WBC responsible for immune system
- Immunoglobin- These are defensive proteins contains all type of antibodies.

- Ig A protect infants from microorganisms like virus bacteria and other pathogens.
- Lactoferrin and Vitamin B12 binding protein – Lactoferrin that is Iron with proteins control the growth of microorganisms Staphylococcus and E coli
- Enzymes mother's milk contains amylase lipase lysozyme peroxidase
- Lipases kills bacteria. Lysozyme promotes cell growth.
- Paramino benzoic acid (PABA) in mother's milk inhibits Malaria.

Psychological benefits

It develops a good relationship between the mother and child

Economic benefits when compared to artificial feeding it is economical

Infant and child mortality Breastfeeding reduces the risk of childhood diseases like Asthma childhood leukemia childhood obesity

Types of supplementary food

- Milk - after 6 months three to four times /day
- Juices of fresh fruits like oranges tomato grapes can be given in small quantities
- Soup from green leafy vegetables
- Cereals and starchy gruels- Gruels, rice, rice flakes, Ragi flour mixed with milk and sugar can be given.
- To prepare amylase rich foods (ARF) the cereal soaked in water for whole night.
- Next day water is removed and cereal is tied in moist cloth and kept in a warm place.

- After 48 hours sprouts come out.
- It should be dried in the sun and roasted.
- The malted cereal is powdered.
- During the process, starch is converted into maltose due to amylase enzyme this is called amylase rich food.
- Vegetables - cooked mashed vegetables like potatoes carrots can be given
- Fruits- all fruit except banana can be given
- Pulses -well cooked pulses along with cereals can be given
- Non- vegetarian foods -boiled egg can be given after 8 months

NUTRITION DURING PRESCHOOL CHILDREN

NUTRITIONAL REQUIREMENTS FOR PRE SCHOOLERS

Energy

- ICMR recommends energy for 1-3 years is 1060 kilo calories per day and for 4 - 6 years is 1350 kilo calories per day.
- Energy is required for growth and activity.
- Up to 10 years of age there is no difference in RDA
- It helps to transport nutrients to all tissues and remove all ways to protect from the tissues.
- It needs for cell growth and development.
- Protein rich foods: milk fish meat egg pulses and legumes

FAT

- ICMR recommends fat for 1-3 is 27 gm per day and for 4 - 6 years is 25 gm.
- Fat helps to increase the calorie density
- Fat rich foods nuts and oil seeds milk and meat products

CALCIUM

- RDA of calcium is 600 mg per day is needed for proper bone and teeth development.
- Deficiency of calcium affect the bone development .
- Calcium rich foods :milk and milk products green leafy vegetables gingelly seeds

Iron

- ICMR recommends iron for preschoolers is 9 - 13 mg 30 and helps to increase the hemoglobin content
- Iron rich foods: rice flakes egg yolk green leafy vegetables jaggery liver
- Vitamin a icmr requirement vitamin a for preschoolers is 400 microgm per day vitamin A helps to improve vision deficiency of vitamin a least night blindness and bitot’s spots
- Vitamin a rich foods liver egg butter green leafy vegetables carrot papaya

Vitamin B

- The daily allowance of vitamin b1 is 0.5 mgs vitamin b2 is 0.6 mgs.
- Dietary folate requirement for 1 - 3 and 4 - 6 year old is 80 and 100 microgm per day
- Vitamin D
- Vitamin d is needed for calcium absorption. Deficiency of calcium leads to rickets.

Nutritional related problems of pre-schoolers

- Protein energy malnutrition is due to the deficiency of calorie and protein.
- Kwashiorkor is seen in age group 2 to 3 years and marasmus in 1 - 2 years

Causes of PEM

- Poverty
- Large number of children
- Poor hygiene and sanitation
- Low birth weight
- High birth rate
- Infectious diseases
- Improper medical facilities

- Cultural practices
  - Late weaning
  - Symptoms of different types of PEM
  - Edema of face and lower limbs
  - Failure to thrive (weight reduction)
  - Anorexia
  - Diarrhoea
  - Apathy
  - Flaky paint appearance
  - Soft and thin hair
  - Angular stomatitis
  - Anaemia

- **Marasmus**

- Failure to thrive
- Diarrhoea
- Anorexia
- The child is shrunk with no subcutaneous fat
- Dehydration
- Temperature is subnormal

Marasmic kwashiorkor

The child with both symptoms of marasmus and kwashiorkor

 Nutritional dwarfing

 Deficiency of calorie and protein intake leads to growth retardation

 Underweight child

 These children have a greater chance of gastrointestinal problems respiratory problems and other infections

Nutritional requirements for PEM

The diet should be rich in protein as well as calories

Energy

- For children less than 2 years 200 calories per kg body weight and for older children 150-175 K.cal per kg body weight.
- There should be enough calories in diet otherwise protein may be utilised for energy purpose instead of building the tissues.

Protein

- 5 gm of protein per kg body weight should be given.
- The diet should be with 3 parts of vegetable protein and one part of animal protein

Fat

- Calories can be obtained from fat
- Fat rich food can be included in their diet

Deficiency of vitamin A

- Preschool children have a greater risk of vitamin A deficiency

 Night blindness: inability to see in night or in poor light.
Rhodopsin is a biological pigment found in retina that enables vision in dim light.

Vitamin a is needed for rhodopsin formation.

Deficiency in vitamin A leads to night blindness.

- **Conjunctival xerosis** :Dry patches in conjunctiva
- **Corneal xerosis** : Cornea becomes dry and loss and loses its clarity
- **Bitot's spot** : Muddy dry triangular patches in eye.
- **Keratomalacia:** Lesion in cornea affects the lens and whole eyeball born leads to total blindness.

NUTRITION DURING SCHOOL AGE

- The school age period has been called the latent time of growth.
- The rate of growth slows and body changes occur gradually.
- It belongs to age group 6 to 12 years.
- Up to 9 years, the nutritional requirements for both girls and boys are same.

Energy

- The calorie intake of 7 - 9 years children is 1670 K.cal and 10 - 12 years is 2010 kilo calories.
- Energy needs varies in child physical activity growth rate and body size. Protein
- ICMR recommends protein intake of 7-9 years is 30 gm and 10 - 12 years is 40 gm.
- Girls requiring more protein than boys due to pubertal changes.
- Protein rich food - milk fish egg meat pulses legumes and whole grains

Fat

- ICMR recommends 35 gm of Fat for school children. Fat provides additional energy.

Minerals

- School going children diet should provide good amount of calcium iron and phosphorus calcium
- Requirement of calcium between 10- 12 years is 800 mg and phosphorus is 800 mg elemental calcium : Phosphorus ratio is 1:1 should be maintained.
- They need to take two to three glasses of milk everyday.
- Calcium rich foods -milk and Milk products agathi leaves gingelly seeds

Iron

- The requirement of iron for 7 - 9 years is 16 mg and for 10 -12 years is 27 mg.
- Iron is needed for hemoglobin synthesis.
- Deficiency of iron leads to anaemia.
- Iron rich foods- rice flakes egg yolk green leafy vegetables Jaggery dried beans dried fruits Ragi Jowar Bajra.

Vitamins

- We should plan a diet with more in vitamin D foods to increase calcium absorption and Vitamin C foods for iron absorption.

Fibre

- We should include more green leafy vegetables in their diet.

Packed lunch

- The packed lunch is a lunch that is packed in a tiffin box to be eaten by the child while away from home.
- Packed lunch must fulfill the quality of nutrients and quantity of portion.
- Things to be considered while planning a packed lunch.

- Packed lunch must fulfill their one third daily requirement of calcium protein and other nutrients
- Packed lunch should consist of all five food groups.
- We should include green leafy vegetables in daily diet
- Variety of food should be included
- Packed lunch must be colourful and nutritious one.
- Packed lunch should contain fruits or buttermilk.
- Milk and Milk products like curd, paneer and addition of egg improve protein quality

Suggested packed lunch

- Vegetable pulao boiled egg tomato raita and orange fruit
- Chapati and carrot salad
- Idli and Kurma
- Sambar rice keerai poriyal and lemon pickle
- Green leafy chapati and thick Dal
- Cheese sandwich and paneer sandwich, Guava.