Nutritional disorders
Nutritional Disorders

• Protein–energy malnutrition (PEM)
• Vitamin A deficiency (VAD)
• Iron Deficiency
• Vitamin B complex Deficiency
• Iodine deficiency
Protein - energy malnutrition (PEM)

- Protein–energy malnutrition (PEM) or protein–calorie malnutrition refers to a form of malnutrition where there is inadequate calorie or protein intake.

Types include:

- Kwashiorkor (protein malnutrition predominant)
- Marasmus (deficiency in calorie intake)
- Marasmic Kwashiorkor (marked protein deficiency and marked calorie insufficiency signs present, sometimes referred to as the most severe form of malnutrition)
Marasmus

- **Marasmus** is a form of severe malnutrition characterized by energy deficiency. A child with marasmus looks emaciated.
- Body weight is reduced to less than 60% of the normal (expected) body weight for the age.
- Marasmus occurrence increases prior to age 1
Marasmus

Clinical Manifestations:

1. Wasting
2. Muscle wasting
3. Growth retardation
4. Mental changes
5. No edema
6. Variable-subnormal temp, slow PR, good appetite, often w/diarrhea, etc
Kwashiorkor

- Kwashiorkor occurrence increases after 18 months.
- Marasmus can be distinguished from kwashiorkor in that kwashiorkor is protein deficiency with adequate energy intake.
Kwashiorkor
Kwashiorkor

Clinical Manifestations:

A. Diagnostic Signs
   1. Edema
   2. Muscle wasting
   3. Psychomotor changes

B. Common Signs
   1. Hair changes
   2. Diffuse depigmentation of skin
   3. Moon face
   4. Anemia
**kwashiorkor**
- swelling of legs (oedema)
- sparse hair
- moon face, with little interest in surroundings
- flaky appearance of skin
- swollen abdomen
- thin muscles, but fat present

**marasmus**
- normal hair
- old man or wizened appearance
- thin limbs with little muscle or fat
- very underweight body
Vitamin A deficiency

- **Vitamin A deficiency (VAD)** is a lack of vitamin A in humans.
- It is common in poorer countries but rarely seen in more developed countries.
- **Nyctalopia** (night blindness) is one of the first signs of VAD.
- **Xerophthalmia,**
- **Keratomalacia,** and
- **Complete blindness**
- Can also occur since Vitamin A has a major role in phototransduction.
Vitamin A deficiency induced Xerophthalmia. The leading cause of childhood blindness.¹

¹ Bulletin WHO 2001 79 (3) 214
Iron deficiency anemia symptoms

Anemia that comes on quickly often has greater symptoms which may include:

• confusion,
• feeling like one is going to pass out
• increased thirst.
• There needs to be significant anemia before a person becomes noticeably pale.
• There may be additional symptoms depending on the underlying cause.
Iron deficiency anemia symptoms

- Easy fatigue and loss of energy
- Unusually rapid heart beat, particularly with exercise
- Shortness of breath and headache, particularly with exercise
- Difficulty concentrating
- Dizziness
- Pale skin
- Leg cramps
- Insomnia
Anemia symptoms
Vitamin B complex Deficiency

Vitamin B$_1$ (Thiamine):

- Deficiency causes **beriberi**. Symptoms of this disease of the **nervous system** include weight loss, emotional disturbances,

- **Wernicke's encephalopathy** (impaired sensory perception), weakness and pain in the limbs, periods of **irregular heartbeat**, and **edema** (swelling of bodily tissues).
Vitamin B$_2$ (Riboflavin):

Deficiency causes ariboflavinosis. Symptoms may include

- **cheilosis** (cracks in the lips), high sensitivity to sunlight,
- **angular cheilitis, glossitis** (inflammation of the tongue),
- **seborrheic dermatitis** or
Vitamin B complex Deficiency

Vitamin B₃ (Niacin):
Deficiency, along with a deficiency of tryptophan causes pellagra.
Symptoms include
• aggression
• dermatitis
• insomnia
• weakness
• mental confusion
• diarrhea
• In advanced cases, pellagra may lead to dementia and death (the 3(+1) Ds: dermatitis, diarrhea, dementia, and death).
Vitamin B₅ (Pantothenic acid)
• Deficiency can result in acne and paresthesia, although it is uncommon.

• Vitamin B₆ (Pyridoxin)
• The classic clinical syndrome for vitamin B₆ deficiency is a
• seborrhoeic dermatitis-like eruption
Vitamin $B_7$ (Biotin):

• Deficiency does not typically cause symptoms in adults but may lead to impaired growth and neurological disorders in infants.

Vitamin $B_9$ (Folic acid):

• Deficiency results in a macrocytic anemia, and elevated levels of homocysteine.

• Deficiency in pregnant women can lead to birth defects.
• **Vitamin B\textsubscript{12} (Cobalamin)**

Iodine deficiency

• **Iodine deficiency** is a lack of the trace element iodine

• It may result in **goiter** (so-called endemic goiter), as well as **cretinism**, which results in developmental delays and other health problems.

• Iodine deficiency is an important public health issue as it is a preventable cause of intellectual disability
Iodine Deficiency Disorders

Goiter

Cretinism