

# Common Nutritional Problems

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# Objectives

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**By the end of the lecture the student will be able to:**

- **Identify the common vitamin and mineral deficiencies**
- **Study the risk factors of these common vitamin and mineral deficiencies**
- **Recognize some common nutritional problems**
- **Understand the prevention of the common nutritional problems**

# 1. Iron deficiency

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Factors affecting requirements and absorption:

**a) Host factors:**

- During growth or pregnancy, iron absorption increases up to 40 –50%.
- Inadequate dietary intake especially when requirements are high.
- Chronic blood loss.

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**b) Type of diet:**

- **Presence of enhancer for absorption: vitamin C, gastric acid, meat and alcohol**
- **Presence of inhibitors: Impaired absorption of iron from diet**

# Iron inhibitors

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- **Low absorbability of iron from plant origin. Decreased intake of vitamin C on daily basis**
- **Precipitation of iron by intake of oxalates and phosphates. phytic acid, calcium, tannin, due to formation of insoluble iron salts.**
- **Hypoacidity of the stomach**
- **Milk and milk products reduce iron absorption by 30% due to high calcium**

# Clinical picture of iron deficiency anemia

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- **Pale skin and mucus membrane**
- **Dyspnea and palpation on mild exertion**
- **Early fatigue**
- **Dry brittle nails which later become flat and spoon-shaped**

# Effects of iron deficiency anemia

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- **Work capacity: decreased efficiency, decreased production and increased accidents in the industries, affecting the economy of the country.**
- **During pregnancy: abortions, premature births, low birth weight, stillbirths, hemorrhages thus resulting in increased infant and maternal mortality rates.**
- **Infections: Susceptibility to infections increases**
- **Growing children: Anemia not only results in growth failure**

# Prevention & control of iron deficiency anemia

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**Adequate dietary intake:**

**Dietary supplementation at risk groups: school age and pregnant**

**Prevention and control of parasitic and pathological conditions associated with blood loss.**

**Case finding and management**

# 2. Calcium Deficiency

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- 1) Vitamin D deficiency
- 2) Magnesium deficiency
- 3) High sodium intake
- 4) High phosphorus intake (found in cola soft drinks and food additives)
- 5) Chronic kidney diseases
- 6) Abnormal parathyroid function (due to neck/thyroid surgery or autoimmune disease).
- 7) Bariatric surgery (gastric bypass)
- 8) Drugs (proton pump inhibitor, chemotherapy, anti-seizure medications)

# Clinical picture of calcium deficiency

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- Numbness and tingling sensations around the mouth or in the fingers and toes.
- Muscle cramps & muscle spasm (tetany)
- Muscle weakness
- Irritability, impaired intellectual capacity, depression, anxiety
- Fatigue

# Clinical picture of calcium deficiency

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- **Hair and skin changes: Coarse hair, brittle nails, psoriasis and dry skin.**
- **Loss of calcium from bones and teeth: osteopenia, osteoporosis and dental caries.**
- **Cataract**
- **Osteoporosis symptoms**
- **Hypercalcemia:**

# 3. Vitamin D Deficiency

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**Risk factors for vitamin D deficiency:**

- 1) Environmental conditions: Living far from the equator where there is little sun year-round and pollution which decrease the ultraviolet rays to the skin.**
- 2) Not eating much fish or dairy products.**
- 3) Concealed clothing style and staying indoors for long times.**
- 4) Sun safety measures: always using sunscreen when going out.**

- 5) Exclusively breast-fed infants**
- 6) Dark skin: low absorption of ultraviolet rays.**

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- 8) Older age: low synthesis of vitamin D.**
- 9) Chronic kidney disease: Affects the cycle of vitamin D synthesis**
- 10) Inflammatory bowel diseases: affects the absorption of vitamin D**
- 11) Obesity and overweight: vit. D is trapped into the fat cells**

# Rickets

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- **Rickets is a condition of defective calcification of the osteoid and epiphyseal cartilage of growing bones.**
- **Rickets affects children between 6-24 months. Deficiency of vitamin D negatively affects absorption, utilization and deposition of calcium and phosphorus in bone**

# Osteomalacia

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**Osteomalacia is a bone disease resulting from deficiency of calcium rather than vitamin D**

**Healthy bone structure is replaced by soft osteoid tissue.**

**This results in rarefaction and softening of bones**

# Osteoporosis

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**Osteoporosis is the condition in which there is reduction in bone density below a mean value by 2.5 standard deviations or more (WHO definition).**

**Osteoporosis means decreased bone mass, while the bone composition is normal**

# Risk factors of osteoporosis

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- 1) **Age:** bone loss starts at the age of 30 years. The most susceptible age of 40 years. the older the higher risk.
- 2) **Sex:** females are significantly at higher risk because of low bone density in general bone, loss increase with menopause.
- 3) **Family history of osteoporosis.**
- 4) **Thin body frame**
- 5) **Delayed puberty in males and menarche in females (since increase growth hormone steroids during puberty are a dominant peak of bone density)**

- 6) Dietary pattern inadequate bone forming and maintaining nutrients (Ca and vit. D)**
- 7) Lack of physical activity and bed rest (months).**

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- 8) Smoking increases the loss of bone and may affect estrogen level.**
- 9) Alcohol consumption**
- 10) Chronic health problem: Hyperparathyroidism, diabetes, rheumatoid arthritis and chronic liver disease and malignancy**
- 11) Drugs: corticosteroids, heparin, cyclosporine and cytotoxic therapy**

# Prevention of Vitamin D deficiency

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- **Good housing and sanitary environment**
- **Health education of mothers highlighting the importance of daily exposure of the infant to sunlight**
- **Specific measures as giving vitamin D supplementation:**
  - a- **Oral drops 400 IU daily**
  - b- **Intramuscular 200,000 IU every 6 months**

# 4. Iodine Deficiency

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Iodine deficiency disease (IDD) is one of the most common nutrient deficiencies in the world.

High prevalence is in the mountainous area. IDD is a problem in oases in Egypt which are away from the sea.

Manifestations and complications of IDD: enlarged thyroid gland:

- Retardation of growth and maturation of all organs especially the brain
- Brain damage: the thyroid has essential control on the neonatal brain development

# Prevention and control

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## **Iodization of salt**

- **Ensure availability of iodized salt in all the country.**
- **Guidance of public about the proper use of the iodized salt as it should be added after cooking so not to lose its iodine.**

# 5. Vitamin A Deficiency

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About 44–50% of preschool-aged children have vitamin A deficiency.

The signs and symptoms are grouped into **ocular** and **extraocular** manifestations.

## **a) Ocular manifestations:**

- Night blindness
- Bitot's spots
- Corneal xerosis

## b) Extraocular Manifestations

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- **Decreased immunological functions**
- **Increased incidence of respiratory and alimentary infections**
  - **Faulty epiphyseal bone formation and retarded growth**
- **Development of urinary calculi**

# Prevention

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**1- Nutrition education**

**2- Vitamin A supplements:**

**a- Given to mothers 1 month after delivery (200,000 IU)  
single oral dose**

**b- Prophylactic supplementation to children is affirmed at  
levels of 100,000 IU for infants 9 months and 200,000 IU for  
children 18 months age**

**3- Periodic supplementation to young children with  
infections.**

**4- Fortification of staple foods with vitamin A.**

# Nutritional deficiency diseases

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- 1- Protein Energy Malnutrition (PEM)**
- 2. Iron Deficiency Anemia**
- 3- B 12-Folate Deficiency Anemia**
- 4- Nutritional Deficiency of bone forming Elements -Rickets  
-Osteomalacia -Osteoporosis -Dental Carie**

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**5- Vitamin A deficiency and Xerophthalmia**

**6- Beri Beri**

**7- Aribofalvin**

**8- Pellagra**

**9- Scurvy**

**10- Iodine Deficiency**

# Protein- Energy Malnutrition

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**PEM is a type of malnutrition resulting from deficiency of proteins and calories in the food over a long period of time.**

**It is very common among young children, who are in the stage of rapid growth and development.**

**Children below 5 years are usually affected and infants are hit hardest.**

# The adverse effects

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- **Growth failure.**
- **Breakdown of immunity, increased susceptibility to infections, prolongation of the recovery period**
- **Impairment of mental capacity and motor skills and decreased alertness**
- **Decreased physical capacity.**
- **The PEM accounts for 5 percent of deaths among preschool children.**

# The most common types of PEM

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## 1- Marasmus:

most common form of PEM. It occurs in the following conditions: The diet is very low in both calories and protein,

## 2- Kwashiorkor:

less common than marasmus

The children are fed on starchy food with less protein intake.

The diet is very low in protein

# Predisposing factors of PEM

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- 1) Excessive loss of proteins and calories (because of vomiting, diarrhea)**
- 2) Increased demand and decreased absorption (because of infections and infestations)**
- 3) Infection contributes to malnutrition and malnutrition predisposes to the causation of infection, it is a vicious cycle.**

