

# Malnutrition and carenic states

**Malnutrition** is a pathological condition caused by a lack of nutrients; advanced stages of malnutrition are referred to as **cachexia**, the highest degree of cachexia being **marasmus**.

**Deficiency disease** is an isolated deficiency of one of the essential nutritional factors (vitamins, trace elements, essential fatty acids). Causes of malnutrition are conditions associated with reduced intake, increased nutrient losses or increased metabolic demands.

## Classification of malnutrition

### According to the extent of the disease

- acute
- subacute
- chronic

### According to the cause of the disease

- **Primary (exogenous)**

They are caused by insufficient supply or excessive output of nutrients. Some of the primary malnutrias affect millions of people.

- **Secondary (endogenous)**

They arise because of impaired nutrient absorption, impaired nutrient utilization (enzyme defects), or nutrient-drug interactions. Environmental factors (xenobiotics, smoking) may also contribute to malnutrition. In addition, diseases leading to malnutrition may also accompany malnutrition.

### According to the missing components of the diet

- **General malnutrition**

Arise from a lack of energy in the food intake (protein energy malnutrition).

- **Specific malnutrition**

Result from a deficiency or excess of particular nutrients.

## Types of diseases

### Marasmus

Marasmus is simply starvation caused by insufficient energy and protein intake. Accompanied by a proportional reduction in fat and fat-free mass edema do not develop, a cachectic appearance is clinically evident with normal albumin concentration and preserved immunoreactivity, nutritional support is able to restore anabolism, an example being mental anorexia.

### Kwashiorkor

Kwashiorkor is a stress, cytokine induced (TNF- $\alpha$ , IL-1, IL-6) malnutrition. The organism is unable to use carbohydrates and lipids as energy substrate. In combination with reduced protein intake, it must use visceral, plasma and muscle proteins. Fat stores do not decrease, edema are present. Clinically, there is poor wound healing, decubitus, more frequent infections. Examples include MODS, sepsis. Nutritional support can only slow down this type of malnutrition.



Marasmus

### Protein-energy malnutrition

It's a combination of marasmus and kwashiorkor.

## Clinical picture of malnutrition

### General symptoms

- Loss of subcutaneous fat causes loss of rounded contours.
- Skin rests loosely over deeper tissues, best seen over the triceps and interosseous muscles.
- Loss of muscle over quadriceps and deltoid, bony appearance of shoulders.

- Hypoproteinemia, swelling perimaleolarly, in sacral region, possibly ascites.
- Changes in mental status, impaired self-sufficiency.
- Changes in mucous membranes, skin and adnexa (alopecia, brittle nails).

## Symptoms of marasmus

- A starved appearance, reduction in weight, fat stores and muscle mass.
- Normal visceral proteins.

## Symptoms in kwashiorkor

- Normal appearance and weight, preserved fat stores.
- Swelling, decubitus, decreased wound healing, more frequent infectious complications.
- Decreased visceral proteins and lymphocytes, increased CRP.



Kwashiorkor

## Nutritional assessment

### Medical history

- weight changes over the past 1-6 months;
- changes in food intake;
- presence of gastrointestinal symptoms (anorexia nervosa, nausea and vomiting, diarrhea);
- physical fitness.

### Physical examination including anthropometric measurements:

- condition of subcutaneous fat, musculature, swelling, ascites;
- weight, height, BMI (below 18.5 is malnutrition);
- determination of adipose tissue and fat-free body mass, thickness of skin eyelashes by callipers, dynamometry, hand grip strength.

### Laboratory findings

- visceral proteins (albumin, transferrin, prealbumin) are decreased;
- lymphocytes are decreased;
- serum cholinesterase activity;
- during stress albumin is negative as well as acute phase proteins;
- increased capillary permeability (capillary leak syndrome);
- after rehydration therapy:

albumin - half-life 21 days - norm 35-50,  
 transferrin - 9 days,  
 prealbumin - 2 days,  
 lymphocytes - 1500-4000.

## Links

### Related articles

- Biochemical nutrition assessment
- Nutritional status assessment
- Obesity
- Dietary carbohydrates
- Dietary fats
- Dietary protein
- Nutrient excess or deficiency diseases
- Dietary recommendations
- Eating disorders

### Source

- PASTOR, Jan. *Langenbeck's medical web page* [online]. ©2006. [cit. 14.11.2010]. <<https://langenbeck.webs.com/interna.htm>>.