



## **INTRODUCTION :**

Malnutrition is the condition that develops when the body does not get the right amount of the vitamins, minerals, and other nutrients it needs to maintain healthy tissues and organ function.

## **DEFINITION:**

### **MALNUTRITION:**

WHO defines Malnutrition as "the cellular imbalance between the supply of nutrients and energy and the body's demand for them to ensure growth, maintenance, and specific functions.

### **PROTEIN ENERGY MALNUTRITION:**

Protein energy malnutrition also referred to as protein-calorie malnutrition. PEM is the terminology used for all kind of malnutrition as result of lack of protein and energy foods. It is a Major public health problem in India and Also called the 1st National Nutritional Disorder., Particularly affects children younger than 5 years old. The most extreme forms of malnutrition or Protein energy malnutrition are Kwashiorkor and Marasmus. PEM is due to “food gap” between the intake and requirement.

### **SEVERE ACUTE MALNUTRITION:**

These includes Oedematous (Kwashiorkor), Severe muscle wasting (Marasmus) and Marasmic kwashiorkor (Both marasmus and kwashiorkor).

#### **Definition:**

A group of clinical conditions that may result from varying degree of protein deficiency and energy inadequacy. Previously it was known as protein calorie malnutrition.

#### **Incidence:**

It is one of the most leading cause of Mortality and Morbidity. It is susceptible to infectious disease. Incidence of malnutrition in India and Africa are high 30% - 40% children younger than 5 years are affected by this SAM.

#### **Causes and Risk factors:**

- 1) Age : children between 6months – 4 years.
- 2) Sex : Boys are frequently affected.

- 3) Too many children in the same family
- 4) Lack of spacing between children.
- 5) Low birth weight births.
- 6) Twin and multiple births.
- 7) Poor growth in the first few months.
- 8) Poor growth in the first few month due to mothers failure to breast feed.
- 9) Failure or stoppage of breast feeding
- 10) Delay in weaning
- 11) Infectious disease such as Diarrhea, ARI, Measles.
- 12) Chronic disease and certain congenital disorders like Failure to Thrive, CHD, growth retardation.
- 13) Lack of adequate care for the pregnant women.

#### **RISK FACTORS:**

- 1) LBW
- 2) Multiple birth
- 3) Lack of breast feeding
- 4) High birth order
- 5) Congenital defects,
- 6) Poor socio economic background
- 7) Single parents/orphans/ foster home
- 8) Maternal deprivation.

#### **CLASSIFICATION :**

##### ✓ **According to severity**

- 1) Mild PEM
  - Weight <3rd percentile for their age but above the -3 SD
  - Growth curve flat tend to point downwards.
- 2) Moderate PEM
  - Weight are equal to or below the -3 SD line but above the -4 SD.
  - No edema , skin or hair changes.
  - alert and appetite is normal
- 3) Severe PEM
  - Weight are equal or below the -4 SD.
  - Marasmus and Kwashiorkor

✓ **IAP CLASSIFICATION**

Grade of malnutrition	Weight for age of the standard	
Normal	>80%	
Grade 1	71-80%	Mild malnutrition
Grade 2	61-70%	Moderate malnutrition
Grade 3	51-60%	Severe malnutrition

✓ **WELLCOME CLASSIFICATION**

<b>Wellcome</b>	<b>Weight-for-age %</b>		
	60-80	Undernourished	Absent
		Kwashiorkor	present
	<60 (= - 4SDS)	Marasmus	Absent
Marasmic-kwashiorkor		present	

✓ **GOMEZ CLASSIFICATION**

<b>Nutritional status</b>	<b>Wt FOR AGE ( % of expected )</b>
normal	> 90
1 <sup>st</sup> degree PEM	75-90
2 <sup>nd</sup> degree PEM	60-75
3 <sup>rd</sup> degree PEM	< 60

**SYNDROMAL CLASSIFICATION:**

- 1) Kwashiorkor
- 2) Nutritional marasmus
- 3) Pre kwashiorkor
- 4) Nutritional dwarfing

## **Kwashiorkor:**

The term was introduced in 1935. Mainly found in preschool children or may at any age. Occur due to deficient intake of both protein and calories.

### **CLINICAL MANIFESTATIONS:**

#### **Essential**

- Marked growth retardation
- Muscle wasting
- Psychomotor changes
- Pitting edema

#### **Non essential**

- Hair change
- Skin changes
- Super added infections

### **GRADING**

- Grade I : Pedal edema
- Grade II : Grade I and Facial puffiness
- Grade III : Grade II and Edema of the chest wall and the para spinal area
- Grade IV : Grade III and Ascites.

### **MARASMUS:**

It is also termed as infantile Atrophy or Athrepsia. Commonly found in infants also in toddlers. Occur due to deficient intake of both protein and calories. The affected child looks like old person with wizened and shriveled face due to loss of buccal pad of fats. Initially the child is irritable, hungry and craves for food. Later stages may become miserable, apathetic and refusal to take anything orally.

### **CLINICAL MANIFESTATIONS:**

#### **ESSENTIAL:**

- Marked growth retardation
- Muscle wasting
- Marked stunting and absence of edema

#### **NON ESSENTIAL:**

- Hair changes (Hypo pigmented)
- Skin changes: Dry, Scaly
- Liver shrunk
- Crave for food.

- Psycho motor changes
- Mineral deficiencies

**GRADING OF MARASUMAS:**

- Grade I : loss of subcutaneous fat in the axilla and groin
- Grade II : Grade I and loss of abdominal fat and fat in the gluteal region
- Grade III : Grade II and Loss of fat in the chest wall and the paraspinal region
- Grade IV: Grade III and Loss of the buccal pad of fat.

**DIFFERENCE BETWEEN MARASMUS AND KWASHIORKOR:**

Kwashiorkor	Marasmus
It develops in children whose diets are deficient of protein.	It is due to deficiency of proteins and calories.
It occurs in children between 6 months and 3 years of age.	It is common in infants under 1 year of age.
Subcutaneous fat is preserved.	Subcutaneous fat is not preserved
Oedema is present.	Oedema is absent.
Enlarged fatty liver.	No fatty liver.
Ribs are not very prominent.	Ribs become very prominent.
Lethargic	Alert and irritable.
Muscle wasting mild or absent.	Severe muscle wasting
Poor appetite.	Voracious feeder.
The person suffering from kwashiorkor needs adequate amounts of proteins.	The person suffering from marasmus needs adequate amount of proteins, fats and carbohydrates.

**MARASMIC KWASHIORKOR:**

It is the condition where the child manifested both the features of marasmus and kwashiorkor. The presence of edema is essential for the diagnosis and other features of kwashiorkor may or may not present.

## **PREKWASHIORKOR:**

A condition when the child is having features of kwashiorkor without edema. If the early management is initiated by early diagnosis of the condition. The child may be protected from full-blown kwashiorkor

## **NUTRITIONAL DWARFING:**

It is a condition when the child is having significant low weight and height for the age without any overt features of kwashiorkor or marasmus. It is usually seen when the PEM continue over a number of years.

## **MANAGEMENT:**

### **Domiciliary management that is Managed at home:**

- ✓ Parents are educated about dietary management.
- ✓ Nutritional counselling and demonstration.
- ✓ Less expensive locally available food
- ✓ Community support system ( supervision).
- ✓ Home visit.
- ✓ Medical follow up ( weight monitoring )

### **Management at Hospital**

- ✓ Needed at advance cases.
- ✓ Mild PEM
  - . Rule out infections
  - . Provide nutritional counselling to parents.
  - . Replace nutrients and breast feed till 2 years of age, with the introduction of supplementary feeding at 4-5 months.
  - . Immunization.
  - . Parents counselling and education
- ✓ Moderate PEM
  - . Treat underlying cause or problems.
  - . Diet is the most important part of treatment.
  - . Provide a reinforced milk diet.
  - . Teach preparation of milk diet
- ✓ Severe PEM
  - . Watch for complications
  - . Dietary treatment includes 4 gm /kg protein.
  - . Marasmus 150-200 kcal/kg per day.
  - . Kwashiorkor 100 kcal /kg per day.
  - . Reinforced milk or high calorie cereal milk can be given.
  - . Children should be Fed with milk diet at the ratio of 125 ml/kg/ day.
  - . Prevent hypoglycaemia.
  - . NG tube feeding.

- . Gradually increase the feed.
- . Schedule 8 feeds per day.
- . Supplement minerals and vitamin and Treat infections

### **COMPLICATIONS:**

- Local infections
- Severe dehydration
- Shock
- Dyselectrolytemia
- Hypoglycemia
- Hypothermia
- CCF
- Bleeding disorder
- Hepatic dysfunction
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- SIDS
- Convulsions

### **Long term complications includes**

- Cachexia
- Growth retardation
- Mental subnormalities
- Visual and learning disabilities.

### **CONCLUSION:**

Protein energy malnutrition is a group of body depletion disorders which include kwashiorkor, marasmus and the intermediate stages. MARASMUS Represents simple starvation where The body adapts to a chronic state of insufficient caloric intake . KWASHIORKOR is the body's response to insufficient protein intake but usually sufficient calories for energy.

### **REFERENCE**

- Darshan sohi, “ A comprehensive textbook of applied Nutrition and dietetics” , 3<sup>rd</sup> edition, published by Jaypee publication.
- Shella John, Jasmine devaselvam, “Essentials of Nutrition and dietetics for nursing”, 2<sup>nd</sup> edition, published by Wolters Kluwer.