Protein Energy malnutrition

- The 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"
  Malnutrition can be
  i) Undernutrition ii) Micronutrient malnutrition or iii) Overweight and Obesity
  Undernutrition can be classified as
  1) Underweight- Low Weight for age, Acute or Chronic
  2) Stunting- Low height for age, Chronic
  3) Wasting- Low weight for height, Acute or Present illness

- Protein energy malnutrition applies to a group of disorder that include **marasmus, kwashiorkor and intermediate states of marasmus and kwashiorkor**. It is due to **"food gap"** between intake and requirement.

Epidemiology - 1st National Nutritional Disorder. More Commonly in children under age 5, Weaning, Poor Economic status, Hygiene and environment place a major role.

Aetiology- It is multifactorial

1. **Socioeconomic, Environment, -** Lack of breast feeding and diluted formula, Improper complementary feeding, Overcrowding in family, Ignorance, Illiteracy, Lack of health education, Poverty, Familial Disharmony
2. **Age of the host-** Infants and children's due to rapid growth, PEM In pregnant and lactating women's it can affect the child, Elderly are affected due to their alteration in Git
3. **Biological –** Infections (HIV), Chronic Diseases, Worm Infestation
4. **Psychiatric diseases** - Anorexia nervosa, depression, isolation

Pathophysiology

Marasmus

Inadequate of calories

Body draws energy from own stores

Rapid emaciation

Kwashiorkor

Adequate carbohydrate and decreased protein

Hypoalbuminemia

Oedema (Nutritional)

Impaired Synthesis of B- lipoprotein

Fatty Liver

Protein Energy malnutrition

Marasmus

It is a form of severe protein energy malnutrition , Due to **less energy intake**

C/f - Usually in Chid between the age of 6 months and one year who have been weaned from breast milk or suffering with chronic diarrhoea

Appearance

1. Hair – Normal or hair loss
2. Face- Buccal pads of fat are lost five an old mans look (Monkey Facies)
3. Muscle wasting and No Oedema
4. Skin – Normal or Wrinkled
5. Bones become prominent

Symptoms

Frequent watery diarrhoea, Failure to thrive, Mostly hungry but cannot eat, Associated Vitamin deficiencies

Mental – Irritability, Apathy, Decreased Social Responses, Attention Deficit,

P/E – Mid arm circumference reduced, Weight reduced by 60 percentile

Secondary infections are common in PEM due to deficient in cellular and humoral immunity.

Kwashiorkor

Term means "The Sickness of the weaning". It is due to **inadequate protein** intake with adequate energy intake.

C/F – Occurs usually in age of 1 to 3 years

Appearance

1. Stunted growth with muscle wasting but not evident due to oedema
2. Subcutaneous fats are not lost so no baby gives a Plump Appearance(Moon face)
3. Oedema which is pitting in nature
4. **Hair- Flag Sign - alternating horizontal bands of hypopigmentation or hyperpigmentation of the hair , Hair becomes straight, readily pluckable, radish colour**
5. **Skin- Flaky paint Dermatosis (Areas of friction or pressure becomes dark pigmented patches and may peel like sun baked blistered paint leading to Flaky paint or peeling paint dermatosis) ii) Crazy paving pattern appearance**

Symptoms

1. Fatty infiltration of liver(Hepatomegaly)
2. Diarrhoea which is offensive
3. Other Vitamin and Micronutrient deficiency may be prominent
4. Secondary infections are common in PEM due to deficient in cellular and humoral immunity

Protein Energy malnutrition

Marasmic Kwashiorkor

Both Symptoms are prominent. With loss of 60 percentile of weight with pitting oedema

Laboratory Investigations

Albumin- Decreased (3.5 to 5.0 gm/dl) and Hypoproteinaemia(Low amino acids, enzymes transferrin)

Hypoglycaemia

Electrolyte – Low Magnesium , Potassium but Sodium increased

Low Urea level due to less protein intake

CBC- Rbc, Hb, Wbc are reduced

Prevention

Primary – Nutritional education, Weaning

Secondary- Early detection and proper treatment

Tertiary- Nutritional rehabilitation at established care

Treatment

Hospital- Correcting Hypothermia, Hypoglycaemia, Infection, dehydration, Electrolyte imbalance, anaemia, vitamin and mineral deficiencies

Dietary – Diet rich in calories and protein

Animal food -Egg, milk, meat, fish

Plants- Pulses (Deficient in methionine) and Cereals (deficient in Threonine, lysine) so their combination is used

Protein Energy malnutrition

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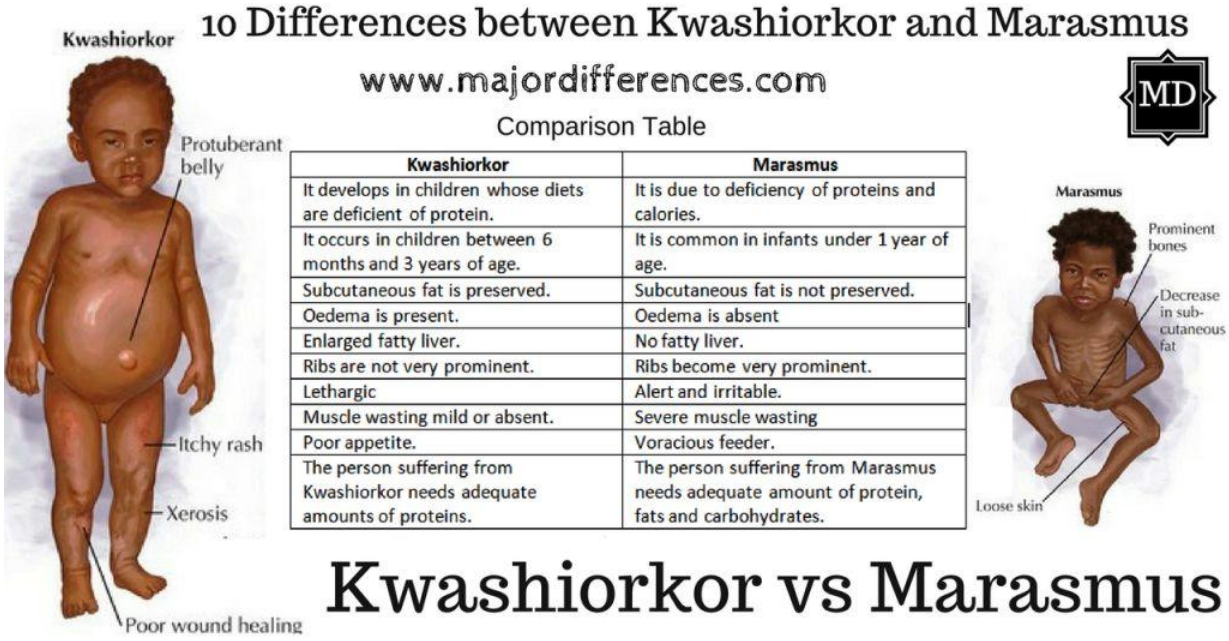

Kwashiorkor	Marasmus
It develops in children whose diets are deficient of protein.	It is due to deficiency of proteins and calories.
It occurs in children between 6 months and 3 years of age.	It is common in infants under 1 year of age.
Subcutaneous fat is preserved.	Subcutaneous fat is not preserved.
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 protein, fats and carbohydrates.

McClaren 42. 'Flag-sign' of marasmus and kwashiorkor.