

PROTEIN ENERGY MALNUTRITION

Dr. PRADEEP N. SAWARDEKAR

Associate professor
Community medicine

PROTEIN ENERGY MALNUTRITION

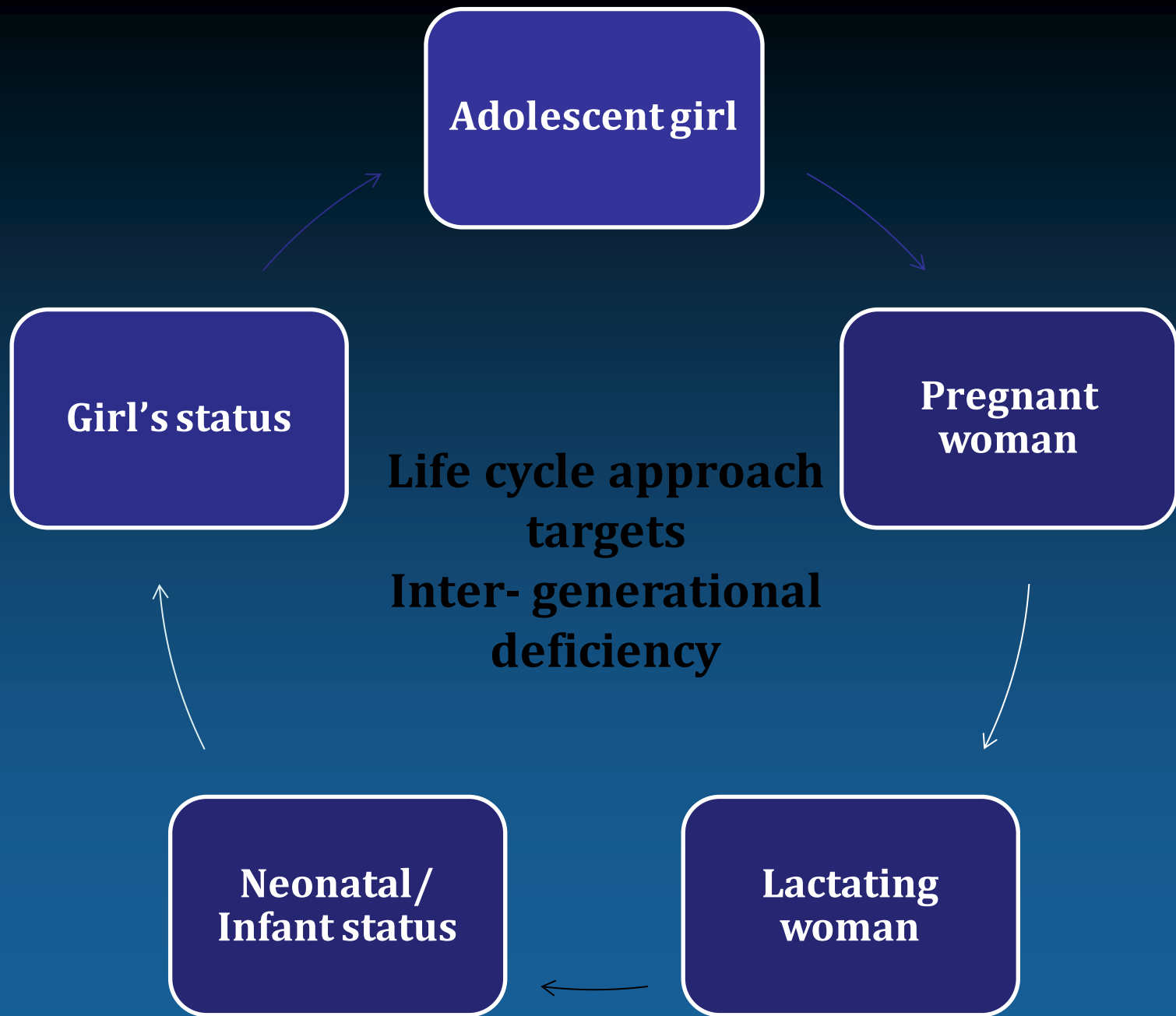
- Identified as a major health and nutrition problem.
- Important cause of morbidity and mortality.
- Leads to permanent impairment of growth.
- 2 different clinical pictures:
 - Marasmus
 - Kwashiorkor

PROTEIN ENERGY MALNUTRITION

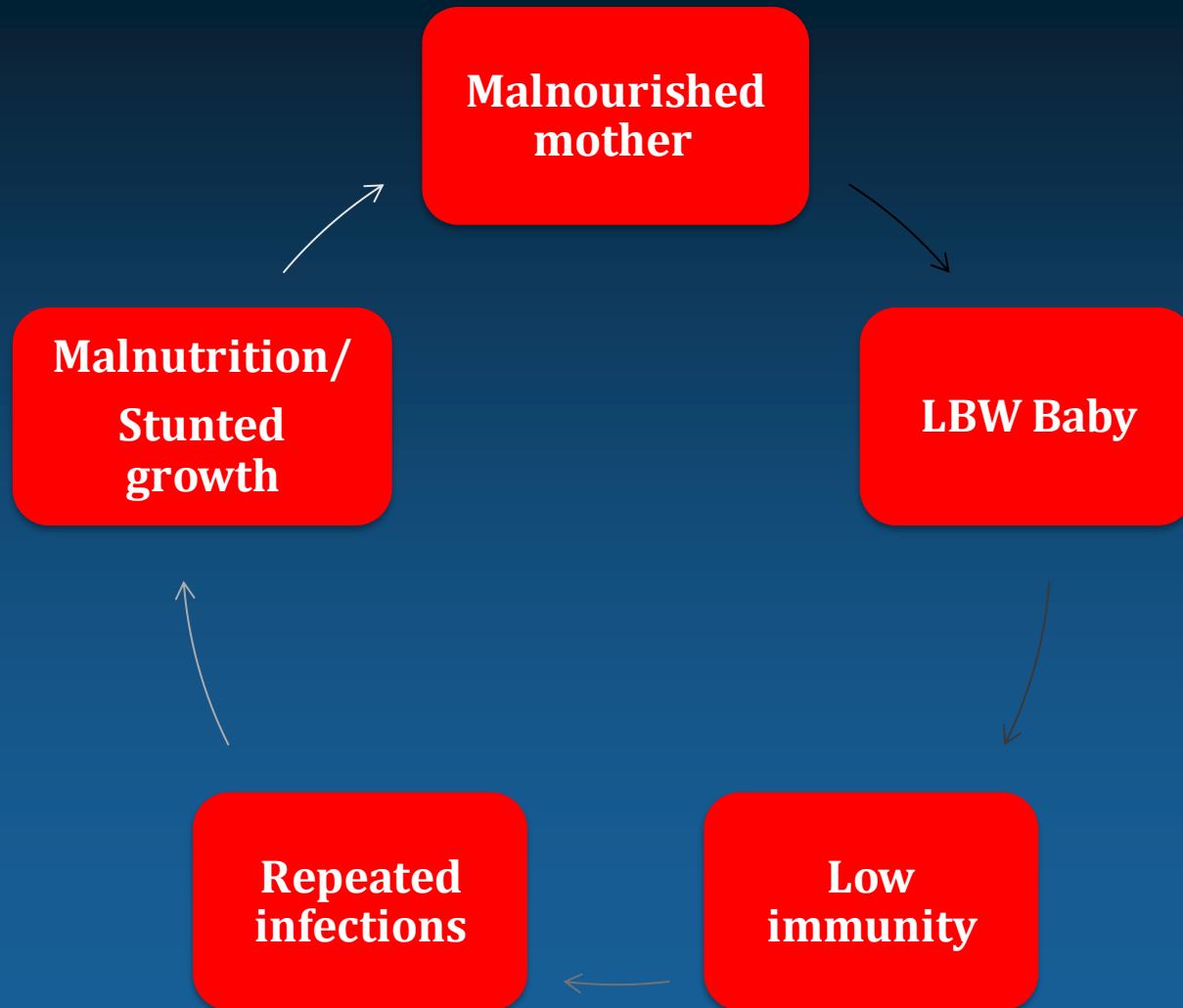
- Incidence in preschool age group is 1-2 %.
- Causes :
 1. Inadequate food intake
 2. Infections
 3. Worm infestations
- Other contributory factors:
 - Poor environmental conditions
 - Large family size
 - Poor maternal health

PROTEIN ENERGY MALNUTRITION

- Other contributory factors:
 - Failure of lactation
 - Premature termination of Breastfeeding
 - Delayed supplementary feeding
 - Adverse cultural practices relating to child rearing and weaning

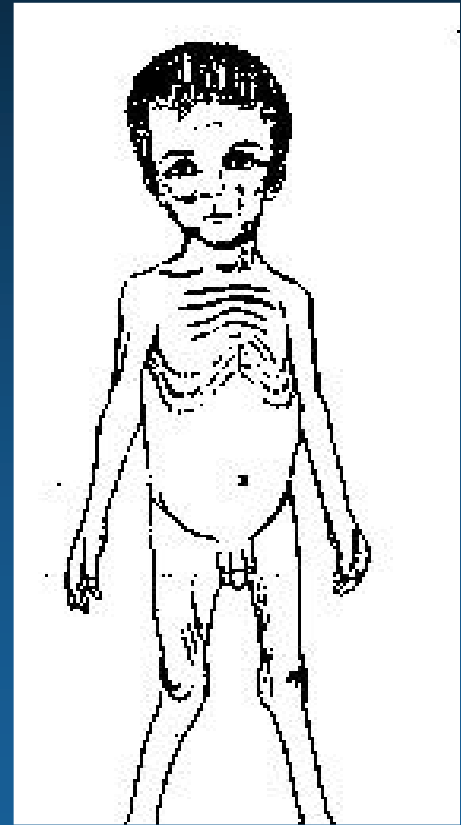


Nutrition Infection Cycle



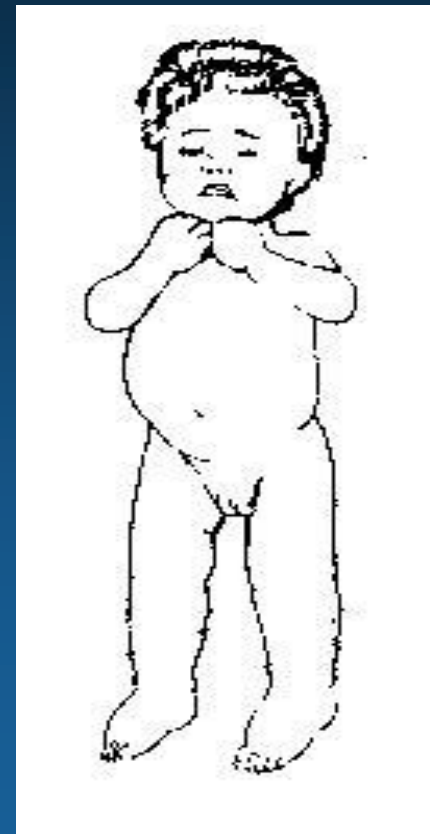
MARASMUS

- Greatly retarded growth.
- Weight below the 3rd or even 4th line on the growth chart.
- Little fat under the skin. The skin is loose and the child looks like an “old man” person.
- Flabby muscles on thighs and buttocks.
- The child is always hungry and cries a lot.
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KWASHIORKAR

- Growth is retarded.
- There is always swelling, mainly on the feet and legs. If you press the thumb on the swollen portion, e.g. on the feet or lower part of the legs, a deep mark remains even after you remove your thumb. It will take some seconds to return to its original condition.
- The child appears “moon faced”.
- The hair often turns red or grey and is easily pulled out.
- The child has no appetite and it is very difficult to feed this child.



PRINCIPLES FEATURES OF PEM

FEATURES	MARASMUS	KWASHIORKAR
clinical	Always present	
Muscle wasting	Obvious	Sometimes hidden by oedema and fat
Fat wasting	Severe loss of subcutaneous fat	Fat often retained but not firm
Oedema	None	Present in lower legs and usually in face and lower arms
Wt. for Ht.	Very low	Low but may be masked by oedema
Mental changes	Sometimes quiet and apathetic	Irritable, moaning, apathetic

PRINCIPLES FEATURES OF PEM

FEATURES	MARASMUS	KWASHIORKAR
clinical	Sometimes present	
Appetite	Usually good	Poor
Diarrhoea	Often	Often
Skin changes	Usually none	Diffuse pigmentation, sometimes 'flaky paint dermatosis
Hair changes	Seldom	Spare, silky, easily pulled out
Hepatic enlargement	None	sometimes, due to accumulation of food

PRINCIPLES FEATURES OF PEM

FEATURES	MARASMUS	KWASHIORKAR
Biochemical	Sometimes present	
Serum albumin	Normal or slightly decreased	Low (< 3 gram /100 ml)
Urinary Urea per gram creatinine	Normal or decreased	Low
Hydroxyproline/ creatinine ration	Low	Low
Plasma/ amino acid ration	Normal	Elevated

Weight gain

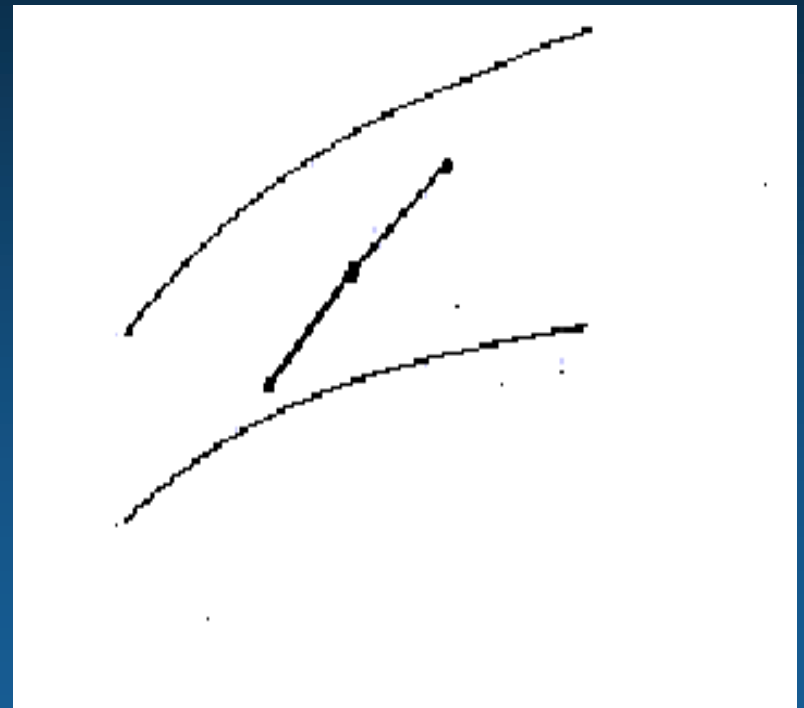
- Growth is measured in different ways. Body weight is the simplest measurement and in children changes in weight is the most reliable indicator of growth. When a baby is born, average weight of Indian baby is 2.5 kg. He doubles in weight by 5th month and at the end of 1 year his weight trebles. After that the increases in weight is not so fast - only about 2 kg. per year.

GAIN in HEIGHT

- Height (or length of the body in the case of infants) is another measure of growth. At birth a baby is about 50 cm. long. At 1 year of age he should be about 72 cm. long, after 2 years till 12 years, usually the child gains 5 to 6 cm. per year. If a child is quite tall but his weight is low, he is thin or wasted. A malnourished child may also be short or stunted.

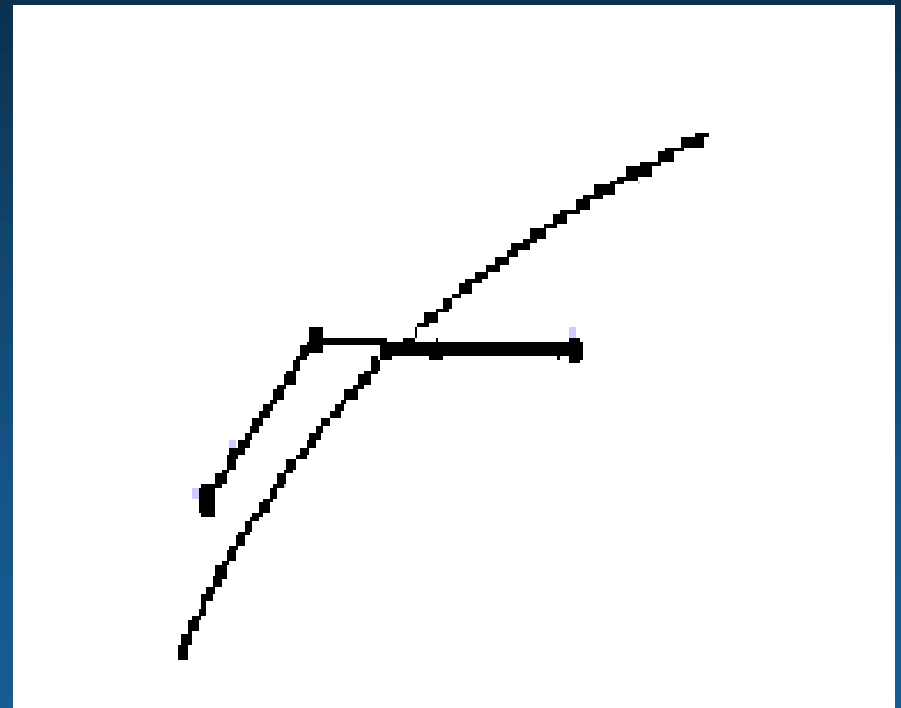
Growth chart

- Section of growth chart showing upward direction of growth curve - GOOD.



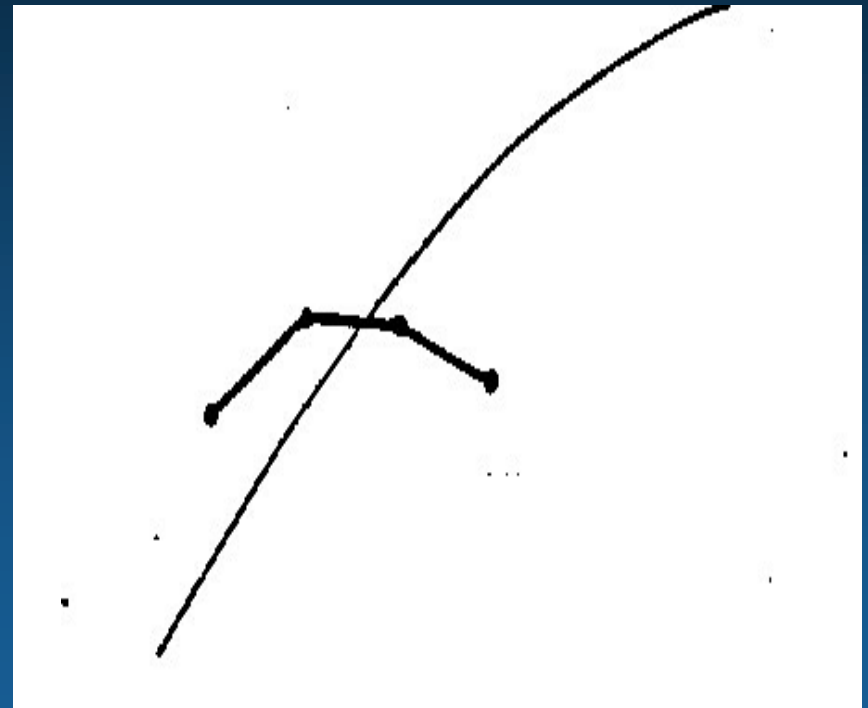
Growth chart

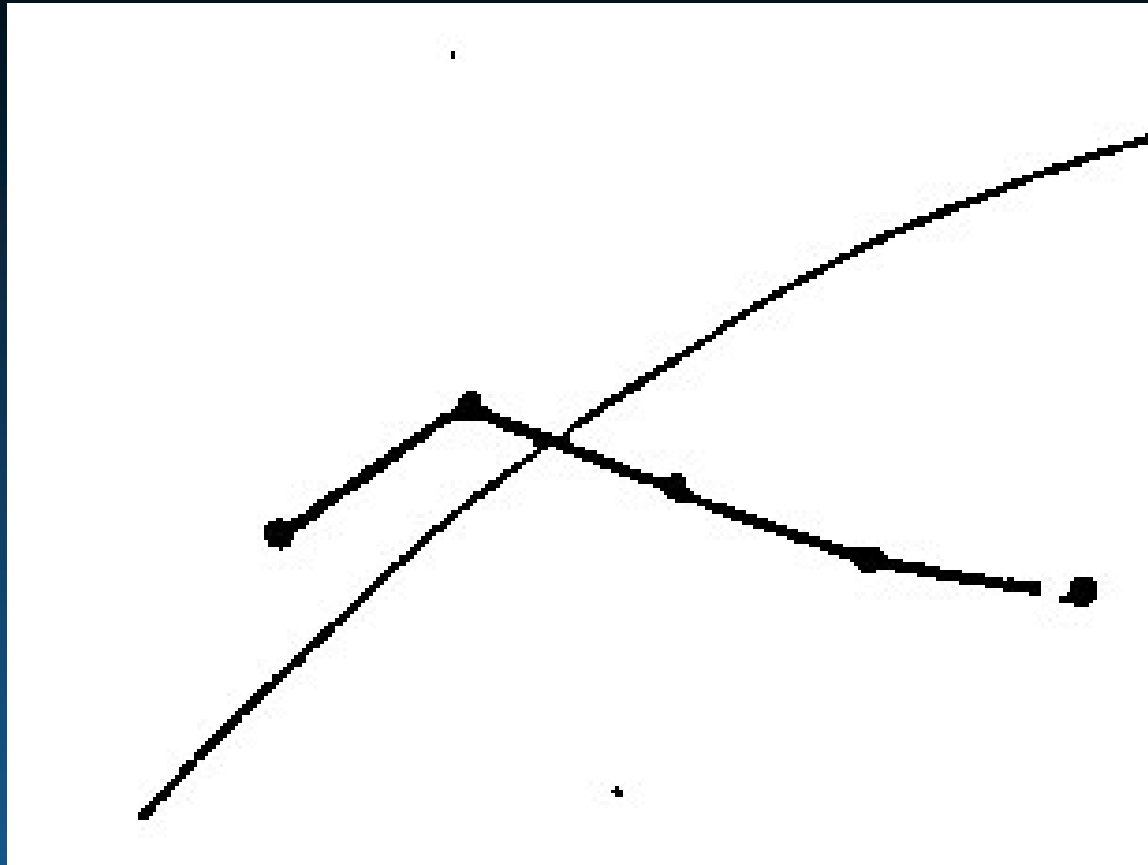
- Section of growth chart showing horizontal growth curve – WARNING SIGN.



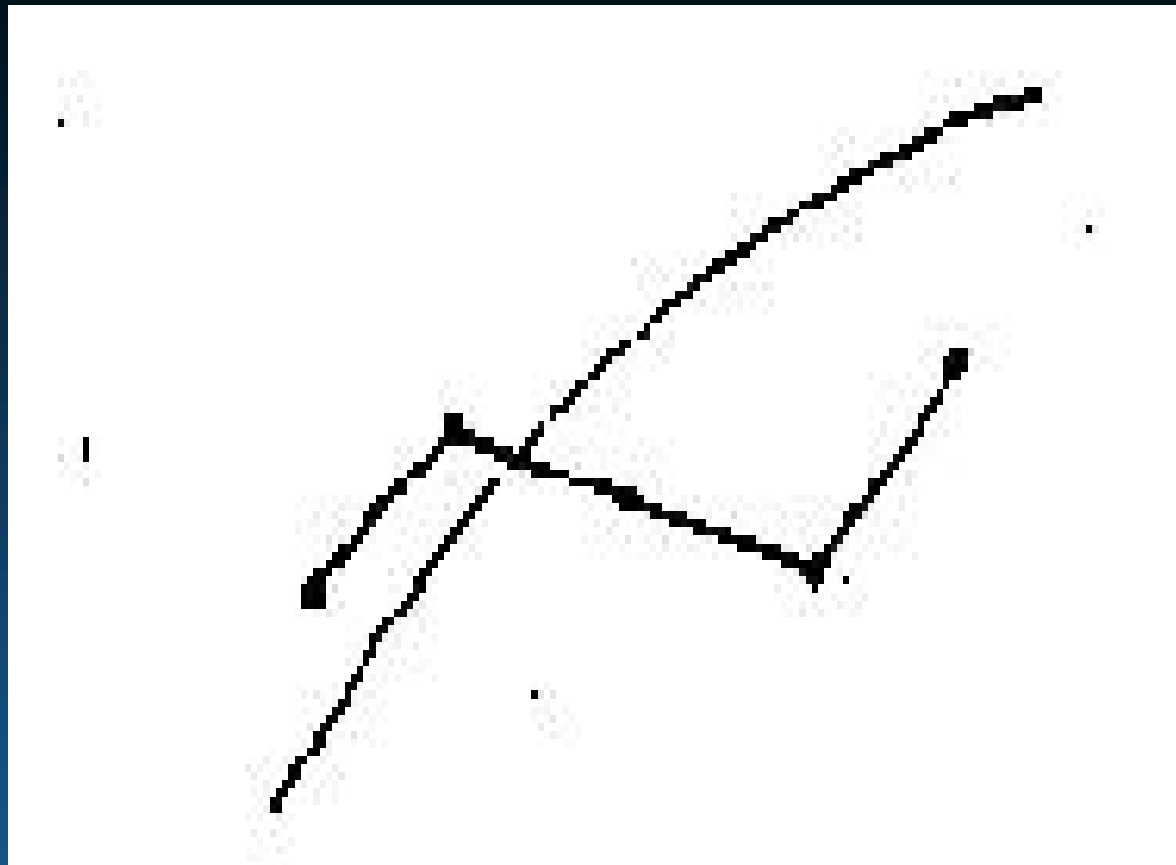
Growth chart

- Section of growth chart showing downward direction of growth curve - DANGEROUS.

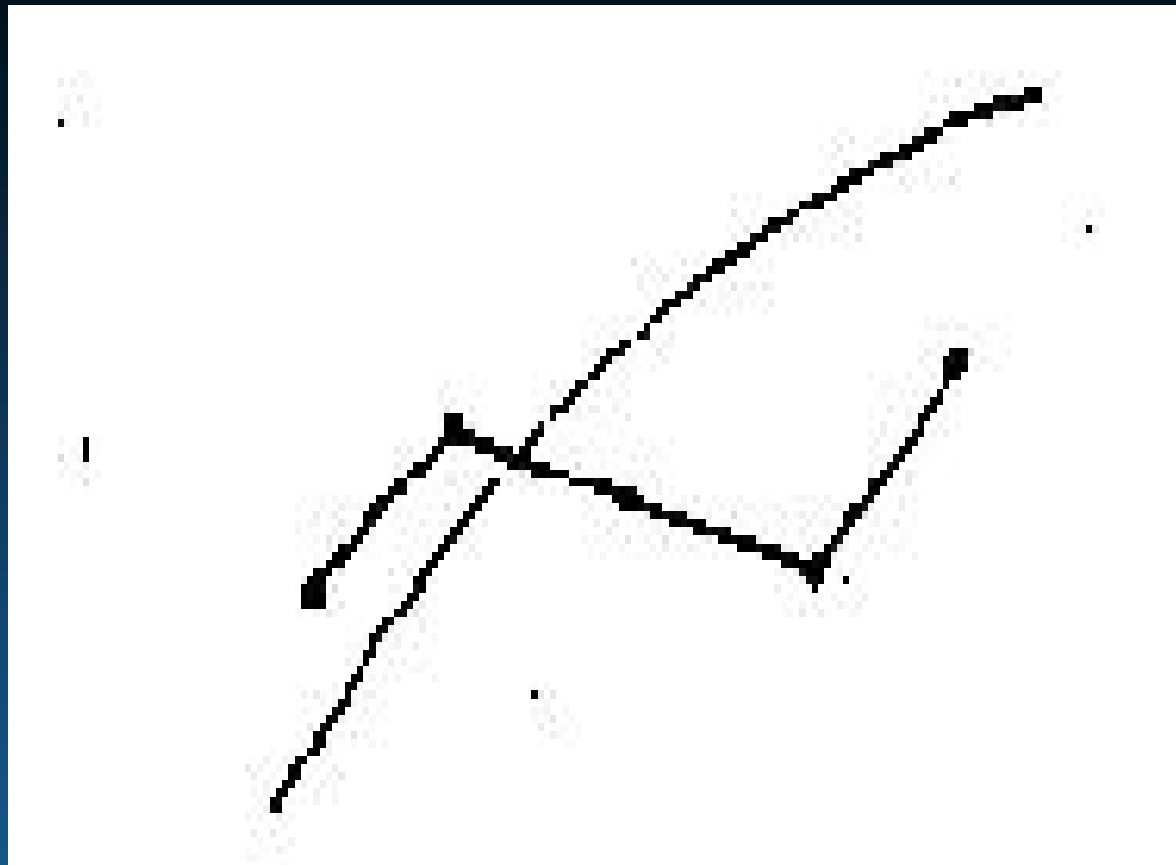




Growth faltering



Catch up growth



Catch up growth

CLASSIFICATION of PEM

- PEM is a spectrum of conditions ranging from growth failure to marasmus or kwashiorkor.
- It is require to identify the interventions-
Nutritional or health.
- Gomez' classification
- Waterlow's classification

GOMEZ' CLASSIFICATION

- Based on weight retardation.
- Locates the child on the basis of weight in comparison with the normal child of same age.
- The normal child is in the 50th centile
- It has a prognostic value for hospitalised children.

$$\text{Wt for age(\%)} = \frac{\text{Wt of the child}}{\text{Wt. of a normal child of same age}} * 100$$

INTERPRETATION

- Between 90-110 % : Normal nutritional status
- Between 75-89 % : 1st degree , mild malnutrition
- Between 60-74 % : 2nd degree , mod. Malnutrition
- Upto 60 % : 3rd degree , severe malnutrition
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DISADVANTAGES

- By measuring only wt. for age it is difficult to know if the low wt. is due to sudden acute episode of malnutrition or to long standing undernutrition.
- Cut-off point of 90% of reference is high (80 % being approx. equivalent to -2SD or 3rd percentile) , thus some normal children may be classified as 1st degree malnourished.

WATERLOW's Classification

- When a child's age is known, measurement of wt. enables instant monitoring of growth:
measurements of height assess the effect of nutritional status on long term growth.

H/A \ W/H	> M-2SD	< M-2SD
> M-2SD	Normal	Wasted
< M-2SD	Stunted	Wasted and stunted

M = mean , SD = Standard deviation

Arm Circumference

It yields a reliable estimation of body's muscle mass.

- It should be done in the age group of 1-5 yrs.
- Satisfactory malnutrition : > 13.5 cm
- Mild- moderate malnutrition: between 12.5 to 13.5
- Severe malnutrition : Below 12.5 cm

Preventive measures

a. Health promotion:

- Measures directed to pregnant and lactating women (education, distribution of supplements)
- Promotion of breast feeding
- Development of low cost weaning foods: the child should be made to eat more food at frequent intervals
- Measures to improve family diet.
- Nutrition education: Promotion of correct feeding practices
- Home economics
- Family environment

Preventive measures

b. Specific Protection:

- The child's diet must contain protein and energy- rich foods
- Immunisation.
- Food fortification

Preventive measures

c. Early diagnosis and treatment:

- Periodic surveillance
- Early diagnosis of any lag in the growth.
- Early diagnosis and treatment of infections and diarrhoea
- Development of programmes for early rehydration of child with diarrhoea
- Deworming of infested children.
- Development of supplementary feeding programmes during epidemic

Preventive measures

d. Rehabilitation:

- Nutritional rehabilitation centre
- Hospital treatment
- Follow-up care.

Thank you

