Pediatrics TeamWork

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Childhood Nutritional Disorders

Done by:

Elham Alami

Revised by:

Arwa AUohany

Team Leader:

Aseel Badukhon

Notes Previous Notes Book Important!

Nutrition in Infants and Children

This topic is important for the course and your life. Parents will always ask you about feeding their children.

Three important topics in pediatrics:
1- Nutrition.
2- Development.
3- immunization.

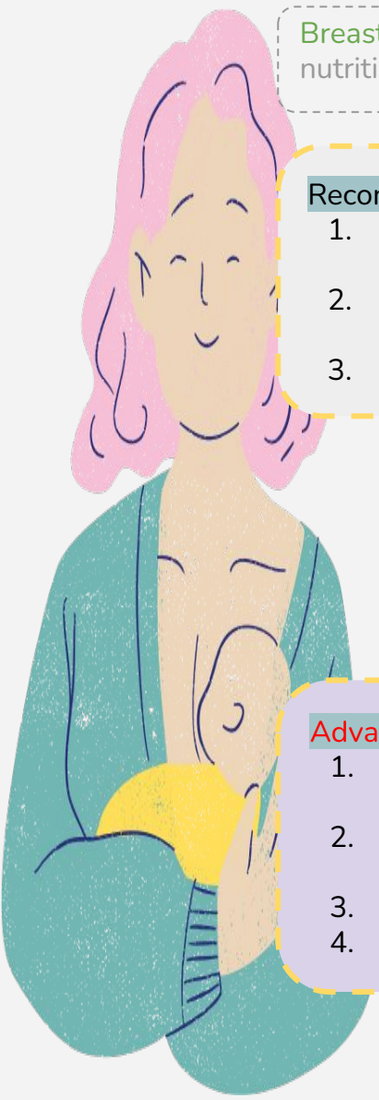
We will talk about:

- Milk formulas.
- Nutritional disorders.
- Complementary feeding.
- Breast feeding.

- Importance of nutrition in infancy and early childhood.
- Adequate nutrition is essential for:
  - Normal health
  - Normal growth and development to full potential.

- Inadequate nutrition cause:
  - Failure to grow normally (FTT).
  - Poor health with increased morbidity and mortality. It increase the incidence of diseases mainly infections.
  - Overweight and obesity with all related complications; because of excess nutrition.

Breastfeeding:



Breastfeeding is important topic for infants and it is the standard way for infants and children nutrition.

Recommendations (WHO):

1. Exclusive (=only) breastfeeding from birth to 6 months of age. It is optimal for infants to be on breastfeeding not even use water until reach 6m.
2. Complementary feeding starting from the age of 6 months. Because after 6m breastfeeding isn't enough for growth.
3. Continue breastfeeding up to 2 years of age or beyond. A new recommendation.

وَالْوَالِدَاتُ يُرْضِعْنَ أَوْلَادَهُنَّ حَوْلَيْنِ كَامِلَيْنِ ۖ لِمَنْ أَرَادَ أَن يُتِمَّ الرَّضَاعَةَ ۚ

Advantages of breast milk:

1. Contains all nutrients needed by the infant during the first 6 months of life. (including macronutrients fat, carbohydrates, proteins, vitamins, minerals and water).
2. Contains bioactive immunologic factors to support the immature immune system. Not available in formula milk.
3. Contains factors that enhance digestion, absorption of nutrients.
4. Readily available and free.

Composition of breast milk: In comparison to formula milk. you need to know it.

1. Fat:
   - Quantity: 3.5 g of fat per 100 ml of milk (about 50% of the energy content).
   - Quality: contains long chain polyunsaturated fatty acids (docosahexaenoic acid (DHA), and arachidonic acid (ARA), *not available in animal milks*; important for the neurological development (This is one of the major advantages).
2. Carbohydrates:
   - Quantity: 7 g/100 ml (higher than others),
   - Quality: contains mainly lactose + oligosaccharides.
3. Proteins: Compared to formula, the protein is lower than formula and it's easy digestible by the immature digestive system of the infant.
   - Quantity: 0.9 g/100 ml (lower than animal milks), this is advantage for baby b/c of less protein load to the kidneys.
   - Quality: Less casein (large curds) and more whey proteins (smaller, softer curds). More lactalbumin and no lactoglobulins (cow's milk intolerance); Lactoglobulins have been implicated as a cause of cow's milk protein allergy or intolerance.
4. Vitamins:
   - adequate except vitamin D, We need to provide Vit D supplements to babies when they are discharged from nurseries.
5. Minerals:
   - Iron and zinc smaller quantity but good bioavailability sufficient for the first 6 m; It's sufficient for the first 6 months, and after that the babies will start take complementary as we said before.
6. 6. Immunologic factors:
   - Immunoglobulins (mainly secretory IgA); Secretory IgA have an essential role in protecting against infection , these can't be found in other formulas milk
   - Whey proteins (lysosomes, lactoferrins).
   - Epidermal Growth Factors.

Contraindications to breastfeeding:

1. Maternal Infections:
   - HIV, human T-cell lymphotropic virus.
   - Untreated tuberculosis (express milk fed by another person). The problem is in contact not in milk.
2. Infants metabolic diseases: rare
   - Galactosemia, lactase deficiencies.
   - Glucose galactose malabsorption.
   - Phenylketonuria.

Milk Formulas:

General introduction:

- These are nonhuman breast milk preparations. Could be from gouts, cow's or camels these are the three main sources but mostly cow.
- They are indicated only when the mother cannot breast feed. It's not the standard feeding.
- Quantitative composition approximates human breast milk.
- However, fails to provide other qualities of human milk such as immunologic factors.

Types of infants formulas:	Formula types usually range between three types.
1- Regular cows-milk based formulas: Cow's milk has been modified to approximate the composition of breast milk.	- First type of cow milk and is used by most mothers. - Most common (normal children). - Regular formulas for infants till 12 months. whole milk afterwards. Fresh cow milk is contraindicated in the first 12 months due to allergy.
2- Follow on formulas (cow-milk based): Has two types and both are not indicated for children that eat well. Only for children who don't take other sources of nutrition other than milk after 6 months.	- Second type of cow milk. 1. Follow on formulas designed for **6 to 12 months** old contain more proteins, Ca, Ph, Fe, and vitamin C may be used. 2. Follow on formulas designed for **1 to 3 years** are not indicated in children eating balanced diet.
3- Soy-based formula:	- Not for normal children; used for diseases caused by CMPA (cow's milk products allergy), lactose intolerance.
4- Other animal-milk formula:	- Such as goats and camels (CMPA). Sometimes it is helpful in some problems of cow milk. Their protein are different from cow's protein.
5- Special formulas:	- Hydrolyzed proteins (oligopeptides and amino-acids): CMPA, intestinal injury. Hydrolyzed proteins: there is no longer lactoglobulin, they are hydrolyzed to smaller competent. 21:30 Hydrolysis reduces amino acid and produces oligopeptide. Indicate in allergy that not tolerate whole milk or normal formula b/c of protein like in intestinal injury can't absorb big protein. - Specialized formulation for specific diseases (phenylketonuria).

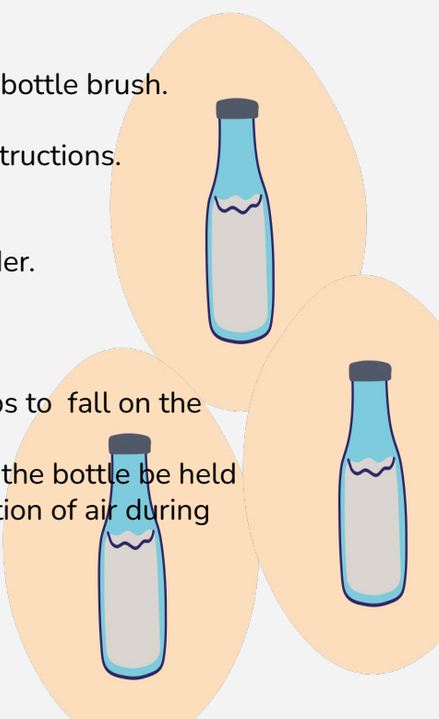
Fluid and caloric requirements (milk formula): Imp

- The first 6 months:
  - ❏ Fluid (water) requirement:150-130 ml/Kg/24h. Make sure that in your history taking you ask the mother about day and night (24h) intake of milk not only during the day.
  - ❏ Caloric requirement: 120- 110 Kcal/kg/24h.
- Regular milk formulas provide 20 Kcal/ounce (0.67 Kcal/ml). Use for evaluation; if baby takes adequate calories if not will get diseases.(25:00)

Usually, in breastfeeding we feed the normal baby as long as they are hungry without calculating the calorie and we don't need to be worry about calculating for them. But in formula you should be careful not to give more than what they need.

Guidelines for bottle milk formula feeding preparation: Doctor skip it
These are found on the can, the mother need to read It before preparing the milk.

1. Clean the bottle and teat in hot soapy water as soon as after a feed using a bottle brush.
2. Rinse before sterilizing.
3. Sterilize using cold water or steam apparatus according to manufacturer instructions.
4. Boil water and allow to cool for about half an hour.
5. Put the water in the bottle before the milk powder.
6. Fill the scoop with milk powder then level it. Do not compact the milk powder.
7. Follow the recommended ratio (1 scoop of powder to 30ml (1oz) water.
8. Close the teat and shake gently until the powder is dissolved.
9. Make fresh feed each time. Refrigeration risks bacterial contamination.
10. The feed should be warm not hot . Test temperature by allowing a few drops to fall on the inside of the wrist.
11. When feeding, the baby should lie comfortably in the crook of the arm, and the bottle be held at an angle so that the teat is always full of milk; this stops excessive ingestion of air during the feed.



Volume and number of formula feedings: Total 150-140 ml/kg/24H

Age	Volume of feed (ml)	Number of feed/24 hours
0 - 2 weeks	50 - 70	7 - 8
2 - 6 weeks	70 - 110	6 - 7
2 months	110 - 180	5 - 6
3 months	180 - 220	5
6 months	220 - 240	4

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This is only guideline, Doctor not focus on it. just remember if the child is younger the number of feed/hour will increases.

Complementary feedings:

Purpose: the objectives: The basic reason to use it is that the breast or formula milk both of them are not sufficient after 6 months.
Breast or formula milk are insufficient for growth after 6 months of age. Therefore, the purpose of complementary feedings is to provide additional nutritional factors to meet growth requirements beyond the age of 6 months.

Age at introduction: This for normal infants (different for infants with Allergic parents).

1. General rules:
   - Continue breast feeding till 2 years and beyond.
   - Start with small amount and increase gradually as tolerated. To test that the baby can tolerate it because they are not used to it.
   - Start with one food item at at a time. Do not start with mixtures. Because if there is intolerance or allergy we will not be able to know which is the cause, once the baby can tolerate all types, know you can give them mixtures.
2. **At 6 months of age:** Iron- fortified cereals (rice cerealsسيرلاك), and mashed or ground fruits (apples, banana, etc).
3. **Around 8 months:** may introduce other items such as corn cereals, boiled pumpkin, carrots and potatoes).
4. **Around 10 months:** may introduce other food such as rice, pasta, ground animal meat and egg yolk.
5. **From 12- 24 months:** Balanced family food.

Nutritional disorders:

Nutritional clinical disorders:

Assessment of nutritional status.

1. Global disorders: Failure to thrive, overweight, obesity.
2. Selective: Minerals and vitamins. deficiency in one mineral.

Nutritional clinical disorders:

1- Global disorders:

Malnutrition (Failure to thrive): starts from underweight and then continues to short stature.	• Underweight: weight for age < 3 rd percentile. • Thinness: BMI for age < 3 rd percentiles. If we use the weight, we call them underweight and if we use the BMI we call them thinner. • Short stature: length/height for age < 3 rd percentile. What is the difference between length/height? Children under 2 years → length and we measure it in supine position with no gravity affect. While in >2 years old → height and we measure it while they are standing.
Overnutrition: the prevalence is extremely high and it defines by **BMI** not by weight.	• Overweight: BMI for age > 85th and < 95th percentile. It is the window of opportunity to help the child before becoming obese. • Obesity: BMI for age > 95th percentile.
Marasmus and Kwashiorkor:	• Mostly cause by chronic diseases which lead to malnutrition. • Seen in wars, disaster and poor areas.

Kwashiorkor

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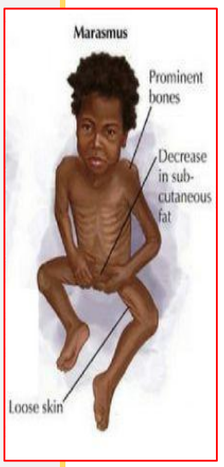
- It develops in children whose diets are deficient of protein.
- It occurs in children between 6 months and 3 years of age.
- Subcutaneous fat is preserved.
- Oedema is present.
- Enlarged fatty liver.
- Ribs are not very prominent.
- Lethargic.
- Muscle wasting mild or absent.
- Poor appetite.
- The person suffering from Kwashiorkor needs adequate amounts of proteins.

Marasmus



- It is due to deficiency of proteins and calories.
- It is common in infants under 1 year of age.
- Subcutaneous fat is not preserved.
- Oedema is absent.
- No fatty liver.
- Ribs become very prominent.
- Alert and irritable.
- Severe muscle wasting.
- Voracious feeder.
- The person suffering from Marasmus needs adequate amount of protein, fats and carbohydrates.

2- Selective disorders:

Minerals:	• Iron deficiency (you can develop iron deficiency before anemia) and iron deficiency anemia are the most common single-nutrient deficiency → Hypochromic microcytic anemia. • Others: calcium, phosphorus, zinc, magnesium, selenium are more rare.
Vitamins:	• Vitamin D deficiency is the most common → Rickets and osteopenia. • Others: B12, folic acid are less common but you have to remember them .Others are uncommon.

Assessment of nutritional status:

History: dietary history for quantity and quality of nutrition.
Objective: determine whether children are taking adequate calories and nutrients:

Physical examination: is the most imp.
General signs of malnutrition: Pallor (suspect Fe deficiency anemia), signs of vitamin and mineral deficiencies: skin and mucosal lesions (zinc), eye lesions (vit A)are rare and need a long time to develop, or skeletal (softness, frequent fractures) (vit D).

Growth charts: The weight is affected very early in malnutrition.

- Underweight: weight for age < 3 rd percentile. If child has underweight but the others are ok so this medical expression of calories deficiency.
- Thinness: BMI for age < 3rd percentile.
- Overweight: BMI for age > 85th and < 95th percentile.
- Obesity: BMI for age > 95th percentile.
- Short stature: length/height for age < 3 rd percentile.

The growth charts is the main source of evaluation the nutritions .

This child didn't grow(underweight), he was on 50 percentile when his age was 24m then he is on 10th percentile. He crossed two lines → FTT. 10 percentile is normal but he was before in 50 and then in 10 and this is not normal.

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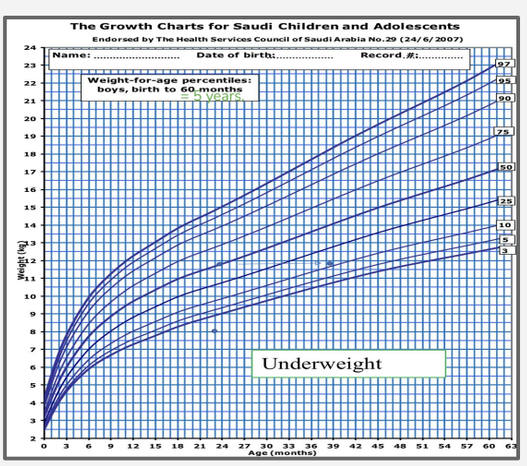
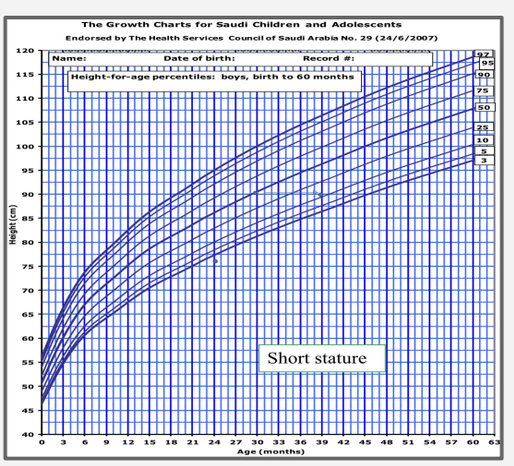
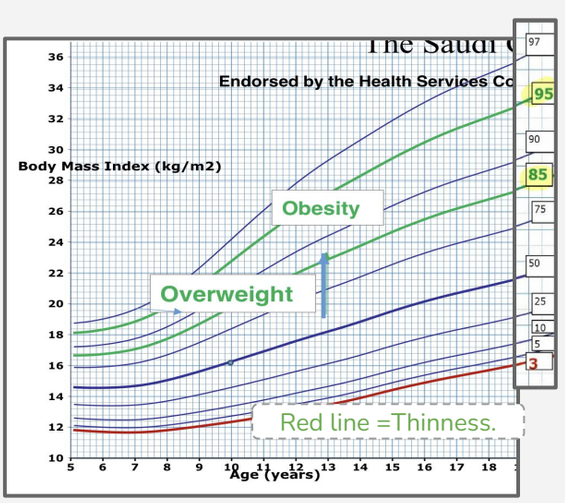
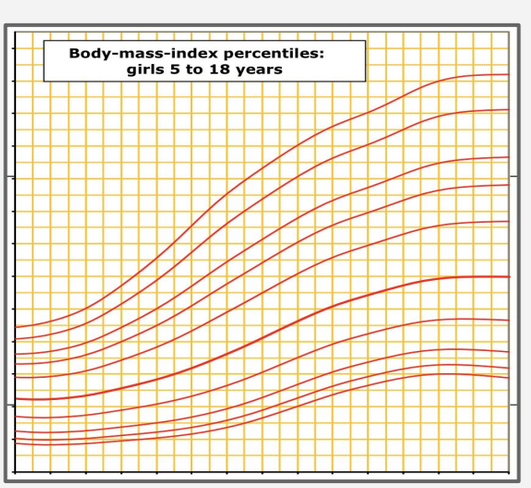
If the crossing is two or more lines (percentiles) without growing or weight for age < 3rd percentile = FFT.









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- **Protein and energy requirements:** The energy requirements of infants relative to body weight is **approximately double that of adults due to rapid growth (makes them vulnerable to nutritional deficiencies)**. A small reduction in the milk volume or quality can significantly impact infant growth, hydration and nutrition.

Table 13.1 Reference values for energy and protein requirements

Age	Energy (kcal/kg per 24 h)	Protein (g/kg per 24 h)
0–6 months	115	2.2
6–12 months	95	2.0
1–3 years	95	1.8
4–6 years	90	1.5
7–10 years	75	1.2
Adolescence	(male/female)	
11–14 years	65/55	1.0
15–18 years	60/40	0.8

- **Body composition:** newborn infants, preterm and those with IUGR have lower fat and protein stores than other age groups, and **the lower the caloric reserves the less likely a person can tolerate starvation**:

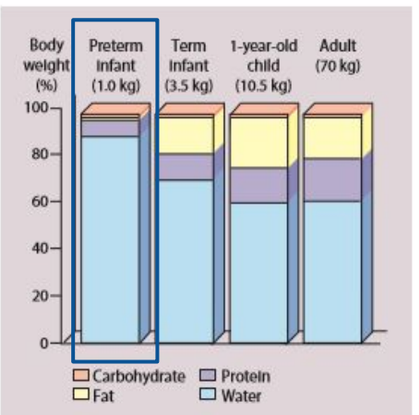

Figure 13.1 Body composition of preterm and term infants, children, and adults. Newborn infants, particularly the preterm, have poor stores of fat and protein.

- **Brain growth:** brain accounts for approximately two-thirds of basal metabolic rate in a baby at term, and for about 50% at 1 year of age. This rapid growth happens in **the last trimester of pregnancy and the first 2 years of life** so any deprivation of energy at this rapid phase of growth can increase risk of **neurodevelopmental impairment**.
- Following **complicated surgery or severe acute illness in an infant**, the energy deficit may be so large that they may require an energy intake as high as **150–200 kcal/kg per day**. Parenteral nutrition (not simply fluids containing dextrose) must be considered early in these children.
- **Poor feeding can become a 'vicious cycle'** that is hard to break, as it can lead to **lethargy**, **hypoglycaemia** and **ketosis**; and a lethargic or hypoglycaemic infant lacks the energy to feed.
- During acute illness children can lose weight but this is **transient**.
- Nasal congestion in infant can **impair breathing** during feeding!
- Which of the following adult diseases can be related to **poor feeding in childhood (particularly first 2 years of life)**? Coronary heart disease, non-insulin dependent diabetes, and hypertension.

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- Additional nutritional support:

Parenteral nutrition (PN)	Enteral nutrition (EN)
It can be **permanent** or **temporary**. **Composition:** glucose + fat emulsion (soya bean oil) + nitrogen (as synthetic amino acid) + electrolytes + vitamins + trace elements + micronutrients. **Zinc deficiency** may happen (you have to monitor the patient for such deficiency). **Conditions necessitating long-term PN** are short bowel syndrome (e.g. following complicated gastroschisis, or a volvulus), enteropathies (often causing severe diarrhoea in very early life), or a motility disorder such as long-segment Hirschsprung disease. **Complications:** CVC sepsis or blockage, venous thrombosis and intestinal failure-associated liver disease.	Used in intact GI tract. Feeds are given nasogastrically, by gastrostomy or occasionally via a feeding tube in the **jejunum** (vomiting or abnormal gastric emptying). Children with cystic fibrosis they need high caloric intake so overnight we may go with EN and orally during the day. If long-term supplemental enteral nutrition is required **(>6 weeks)**, a gastrostomy.

Nutritional deficiencies

Table 13.3 Vitamin deficiencies affecting children

Vitamin	Dietary/environmental sources	When deficiency is encountered	Clinical consequences
Fat-soluble vitamins			
A	Retinol: Liver, fish liver oils, dairy products Carotenoids: in spinach, carrots, mango, papaya	Fat malabsorption conditions e.g. cystic fibrosis Children in low-income countries who do not receive supplements	Increased susceptibility to infection, especially measles Xerophthalmia (dryness of the conjunctiva and cornea) Night blindness
D	90% from ultraviolet B exposure Eggs Fortified foods including margarine, certain yoghurts and breakfast cereals	Children who live further from the Equator, as ultraviolet B levels are low outside summer months Children with darker skin or when exposure to sunlight is limited	Rickets
E	Vegetable oils	Fat malabsorption conditions Preterm infants	Haemolytic anaemia, retinopathy, progressive neuropathy
K	Green leafy vegetables – the richest sources Other vegetables, fruits, dairy produce, vegetable oils, meats and cereals Synthesized by intestinal bacteria Given intramuscularly (occasionally orally) at birth (see Ch. 10, Perinatal medicine)	Newborn infants are vitamin K deficient Seen in children with fat malabsorption	Coagulation abnormalities - lead to bruising/bleeding from vitamin K deficient bleeding (haemorrhagic disease of the newborn)
Water-soluble vitamins			
Thiamine (B_1)	Yeast, brown rice, wheatgerm, nuts, pork, pulses	Deficiency is beri-beri Children from South East Asia with a 'polished rice diet' or those with malnutrition	Cardiomyopathy in infants, also hoarseness, aphonia, encephalopathy, apathy, drowsiness, seizures
Riboflavin (B_2)	Yeast, organ meats (such as liver and kidney), lean meat, milk and milk products, eggs, vegetables, fortified breakfast cereals	Malnutrition	Angular stomatitis, fissuring of lips
Niacin (B_3)	Liver, meat, oily fish, soya, nuts, seeds, pulses, eggs, dairy products, grains	Deficiency is pellagra Malnutrition Regions where maize a major part of the diet	Thick, scaly skin, swollen mouth, fatigue, vomiting and diarrhoea
Pantothenic acid (B_5)	Found in animal and plant products	Very rare as found in almost all foods Can occur in starvation	Fatigue, apathy, paraesthesia, muscle cramps, hypoglycaemia
Pyridoxine (B_6)	Found in a wide variety of foods Also synthesized by intestinal bacteria	Isolated deficiency is rare. Can be found together with B_{12} and folic acid deficiency	Microcytic anaemia, glossitis, cheilosis, confusion, increased susceptibility to infection
B_{12}	All animal products, yeast extract	Children on a vegan diet, not receiving supplementation Resection of small intestine where B_{12} is absorbed Pernicious anaemia	Megaloblastic anaemia, weakness and fatigue, paraesthesia
Vitamin C	Fresh fruit and vegetables	Deficiency is scurvy Rare but can occur in children with very restrictive diets or neurodisability	Petechiae and bruising, gingivitis, coiled hair, poor growth, irritability; painful joints, impaired wound healing
Folic acid	Green leafy vegetables, yeast extracts, liver, fortified breakfast cereals	Children taking antifolate medications or those with haemolytic conditions Malnutrition	Macrocytic anaemia, neutropenia, thrombocytopenia

Rickets

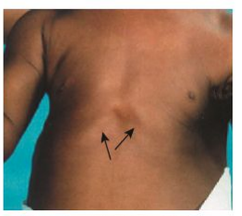

Figure 13.15 Harrison sulcus, indentation of the softened lower ribcage at the site of attachment of the diaphragm. (Courtesy of Nick Shaw.)

Figure 13.16 Severe rickets in a 3-year-old boy secondary to coeliac disease. He has frontal bossing, a Harrison sulcus and bowing of the legs. (Courtesy of Ian Booth.)

Box 13.4 Clinical features of hypocalcaemia and rickets

- Misery
- Poor growth/short stature
- Frontal bossing of skull
- Craniotabes
- Delayed closure of anterior fontanelle
- Delayed dentition
- Enamel hypoplasia
- Rickety rosary
- Harrison sulcus
- Expansion of metaphyses (especially wrist)
- Bowing of weight-bearing bones
- Pathological fractures
- Hypotonia
- Delayed motor milestones
- Seizures
- Cardiomyopathy/heart failure

Box 13.3 Causes of rickets

Nutritional (primary) rickets – risk factors
- Living in northern latitudes
- Dark skin
- Decreased exposure to sunlight
- Diets low in calcium, and vitamin D, e.g. exclusive breastfeeding into late infancy or, rarely, toddlers on unsupervised 'dairy-free' diets
- Extreme prematurity – inadequate phosphate intake in breast milk and parenteral nutrition
- Macrobiotic, strict vegan diets
- Prolonged parenteral nutrition in infancy

Intestinal malabsorption
- Small bowel enteropathy (e.g. coeliac disease)
- Pancreatic insufficiency (e.g. cystic fibrosis)
- Cholestatic liver disease
- High phytic acids in diet (e.g. chapattis)

Defective production of 25-hydroxyvitamin D
- Chronic liver disease

Increased breakdown of 25-hydroxyvitamin D
- Enzyme induction by anticonvulsants (e.g. phenobarbital)

Defective production of 1,25-dihydroxyvitamin D
- Chronic kidney disease
- Fanconi syndrome (renal loss of phosphate)
- Inherited disorders (rare) e.g. vitamin D-dependent rickets type 1

Resistance to effect of 1,25-dihydroxyvitamin D
- Vitamin D-dependent rickets type 2

Hypophosphataemic rickets
- X-linked hypophosphataemic rickets
- Other inherited types of hypophosphataemic rickets
- Hypophosphataemia due to primary or secondary tubulopathy
- Lack of bioavailable dietary phosphate (rare)

Vitamin D deficiency usually presents with tiredness and pain in the leg bones which is worse on exertion. It also can present with symptoms of **hypocalcemia** and that is true during phases of high utilization of Ca (before 2 years and adolescence). Nutritional rickets is treated with **vitamin D supplements**. Bone healing starts within **2–4 weeks** but may take several years for all bony deformities to resolve. **To prevent recurrence:** sun exposure, balanced diet and control predisposing factors.

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Malnutrition

Summary

Malnutrition

- Worldwide – contributes to about one-third of all childhood deaths.
- Can be identified by measuring weight for height, mid-upper-arm circumference (MUAC), and height for age.
- Marasmus – wasted, wizened appearance, apathetic.
- Kwashiorkor – generalized oedema, sparse and depigmented hair, skin rash, angular stomatitis, distended abdomen, enlarged liver, and diarrhoea.

- There is an increased risk of developing **diarrhoea**, **pneumonia** and **sepsis**. Malnutrition worsens the outcome of illness, e.g. respiratory muscle weakness may delay a child being weaned from mechanical ventilation.
- Proper feeding can **reverse** some behavioral abnormalities caused by malnutrition but a **prolonged malnutrition can cause permanent cognitive impairment**.
- **Management:** if the child has appetite and alert >> community with ready-to-use therapeutic food (**RUTF**). Children with no appetite or has edema, medical complication or are less than 6 months >> hospitalization and **follow the acute management (10 steps, stabilization):**

- treat or prevent hypoglycaemia urgently
- treat or prevent hypothermia
- treat or prevent dehydration – but avoid fluid overload. The standard WHO oral rehydration solution contains too much sodium (Na^+ 75 mmol/l) and too little potassium for severe acute malnutrition; they should be given a special rehydration solution – ReSoMal (rehydration solution for severely malnourished children). Rehydration should be provided orally, by nasogastric tube if necessary. Intravenous fluids are given only for shock
- correct electrolyte imbalance – especially potassium and magnesium. Although plasma sodium may be low, they have excess body sodium
- treat infection – give broad-spectrum antibiotics; fever and other signs may be absent. Treat oral *Candida* if present
- correct micronutrient deficiency – vitamin A and other vitamins; contained in specialized feeds. Introduction of iron is delayed to second week
- initiate feeding – small volumes, frequently, including through the night. Too rapid feeding may result in diarrhoea. Specialized feeds are widely available: initially Formula 75 (75 kcal/100 ml) which is low in protein and sodium and high in carbohydrate is used, subsequently Formula 100 (100 kcal/100 ml) or ready-to-use therapeutic food.

The remaining three steps are provided during rehabilitation:

- achieve catch-up growth
- provide sensory stimulation and emotional support
- provide for follow-up after recovery.

INFANT FEEDING

0 – 6 months EXCLUSIVE BREASTFEEDING recommended for first 6 months

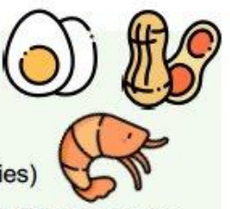
- Breastfeeding can continue for **2 years or longer** as desired by mother & infant
- The only supplement breastfed infants require is **vitamin D3 400 units PO daily** (avoid D2 & multivitamins)
- **Spitting up is common** in infants & shouldn't lead to discontinuation of breastfeeding

Do:
- ✓ Reassure parents that newborns normally experience weight loss in the first 1-2 weeks
- ✓ Should **regain birth weight by 10-14 days of life**, and continue to grow steadily thereafter (~20-30g/day for first 3 months, then 75-200 g/week from months 3-6)
- ✓ Encourage regular check ups. Nutrition monitoring can be done using **WHO Growth Charts**

Failure to Thrive (FTT)

Sometimes defined as **weight <3rd percentile** on appropriate growth chart, or when infant **crosses two major percentiles.** The most common cause is **inadequate caloric intake.**

4 – 6 months INTRODUCTION OF ALLERGENIC FOODS



- Early **introduction of allergenic foods between 4-6 months** of age may have a role in preventing food allergy, particularly egg and peanut in high-risk infants
- Allergenic foods: **peanuts, tree nuts, egg, soy, shellfish**, and others
- High-risk infants: those with a 1st degree relative with atopy (eczema, asthma, allergies)
- No more than **1 potential food allergen should be introduced at one time**. Wait 2 days to assess for any signs or symptoms of allergic reaction
- No evidence that the order of solid food introduction affects the risk of food allergy development

6 – 12 months COMPLIMENTARY FOODS INTRODUCED

Iron-rich solid foods include: Iron-rich foods. Examples include meats (beef, lamb, poultry), seafood and fish, meat alternatives & iron fortified cereals (tofu & legumes cooked until soft)

- Iron stores from maternal nutrition deplete by ~6 months old
- Complementary feeding should be offered by latest 9 months old
- Exposing children to as many new foods as possible can help promote healthier eating habits later in life

Signs of readiness for complementary foods

- ➢ Infant has better control of their head, can sit up & lean forward
- ➢ Infant can pick up food and put in their mouth, as well as shows signs they're full (ex. turning head away)
- ➢ Infant can express 'interest' in feeding (ex. watch others eat)

9 – 12 months PASTEURIZED MILK

- Pasteurized Homogenized (3.25% M.F.) cow's milk may be introduced

Avoid honey under the age of 12 months old. Honey = only food directly linked to infant botulism, as even pasteurization does not kill the spores of *Clostridium botulinum.*

Published July 2021
Michelle Schneeweiss (Medical Student, McMaster University) and Dr. Jason Silverman (Pediatric Gastroenterologist, University of Alberta) for www.pedscases.com