Nutrition for Infant, Toddler, Childhood & Adolescent
Pediatric Nutrition Assessment

A. Anthropometric Assessment
B. Biochemical Assessment
C. Clinical Assessment
D. Dietary Assessment
B. Biochemical Assessment

Albumin, Hemoglobin, cholesterol, Triglyceride and serum glucose.

C. Clinical Assessment

APGAR score, diagnosis or history of chronic or acute conditions.
D. Dietary Assessment

- Energy
- Protein
- Fat
- Carbohydrate
- Water
- Vitamins and minerals
## Energy and protein needs in pediatric patients

<table>
<thead>
<tr>
<th>Age</th>
<th>Average Energy Allowance (kcal/kg)</th>
<th>Protein Requirements (gm/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to 6 months</td>
<td>108</td>
<td>2.2</td>
</tr>
<tr>
<td>months 6-12</td>
<td>98</td>
<td>1.6</td>
</tr>
<tr>
<td>years 1-3</td>
<td>102</td>
<td>1.2</td>
</tr>
<tr>
<td>years 4-6</td>
<td>90</td>
<td>1.1</td>
</tr>
<tr>
<td>years 7-10</td>
<td>70</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Fat:
30-54% of kcal.

Carbohydrate:
30-60% of kcal.

Vitamins and minerals
**Fluid Requirements (gm/kg)**

- **1st 10 kg**: $\rightarrow 100 \text{ ml/kg}
- **11-20 kg**: $\rightarrow 1000 +50 \text{ ml/kg above 10}
- **>20 kg**: $\rightarrow 1500 +20 \text{ ml/kg above 20}$
Example

3/12, wt = 5.6 kg

Energy requirement for 3 month old baby 108 kcal/kg (table)

$5.6 \text{ kg} \times 108 \text{ kcal/kg} = 604 \text{ kcal/day}$.

Protein requirement for 3 month old baby 2.2 gm/kg (table)

$5.6 \text{ kg} \times 2.2 \text{ gm/kg} = 12.3 \text{ gm/day}$.

Fluid requirement $1^{st}$ 10 kg $\rightarrow 100 \text{ ml/kg}$

$5.6 \text{ kg} \times 100\text{ml/kg} = 560 \text{ ml/day}$
Introduction of milk and solid food

Milk for infants:
Breast feeding Vs. formula feeding

Food for infants and children

(lecture)
Some Pediatric Formula for Normal Infants

- From 0-6 months
  - Similac advance
  - NAN 1
  - Biomil 1
- High iron (3 months)
  - Similac with iron
- From 6-12 months
  - Similac gain
  - NAN 2
  - Biomil 2

Note: the previous formula provide 1 kcal/1 ml
At 4-6 month we first introduce refined cereal or rice.

Then some vegetable (ex. Mashed potato, carrots & squash)

Then some fruits (ex. strained apple & pears)

Before 1 year (infancy year):
No cow milk
No honey
No wheat
Foods most often causing choking

- Hot dogs
- Tough meat
- Celery
- Popcorn
- Peanut butter
- Watermelon with seed
- Candy
- Nuts
- Grapes
- Raw carrots
 FAILURE TO THRIVE (FTT)

**Definition FTT:** weight loss or lack of weight gain in a child because of an acute or a chronic illness, a restricted diet, poor appetite, lack of food, lack of social interaction, or harsh disruptive environment.

FTT is considered a symptom rather than a diagnosis.
Catch-up for growth:

- Total energy & protein requirement for catch-up for growth maybe 150% or more than expected needs.

- Foods that have minimal value should be discouraged, high calorie meals should be recommended.

- The patient is considered FTT when Wt/Age or Wt/Ht or Both below 5th%.
Estimating Calorie & Protein needs for catch-up Growth

**Catch up Growth Requirement Energy**
(kcal/kg/day) = 
Calorie required for wt age (kcal/kg/day) × Ideal wt for age (kg)

Actual weight (Kg)

1-Plot the child's Ht and Wt on the growth chart.
2-Determine at what age the present weight would be at the 50 th percentile (weight- age).
3-Determine recommended calorie for weight- age.
4-Determine the ideal weight (50 th percentile) for the child's present age.
5-Multiply the value obtained in (3)by the value obtained in (4).
6-Divide the value obtained in (5) by the actual weight.
Estimate protein requirements during catch-up growth can be similarly calculated, as follows:

Protein requirements (gm/kg/day) =
Protein required for Wt Age (kcal/kg/day) \times \text{Ideal Wt for Age (kg)} \div \text{Actual Weight (Kg)}
Example

Mohammad is 2/12, boy
Wt = 3.8 kg
Ht = 53 cm

Wt/age < 5th percentile
Ideal wt/age = 5.2 kg

Ht/age < 5th percentile
Ideal Ht/age = 58 cm

Wt/Ht is on 25th percentile
Ideal wt/Ht = 4.1 kg

In case of catch-up growth ➞ wt-age chart
3.8 kg ➞ 1 week old
1- \( Wt = 3.8 \text{kg} \)

2- 50th %

3- Ideal age = 1 wk
**Catch up Growth Requirement Energy (kcal/kg/day)** =
Calorie required for wt age (kcal/kg/day) X Ideal wt for age (kg)
Actual weight (Kg)

\[= \frac{108 \times 5.2}{3.8} = 147 \text{ kcal/day/kg}\]

\[\Rightarrow 147 \text{ kcal/day/g} \times 3.8 = 558.6 \text{ kcal/day}\]

**Protein requirements (gm/kg/day)** =
Protein required for Wt Age (kcal/kg/day) X Ideal Wt for Age (kg)
Actual Weight (Kg)

\[= \frac{2.2 \times 5.2}{3.8} = 3 \text{ gm/kg/day}\]

\[\Rightarrow 3 \times 3.8 = 11.4 \text{ gm/day}\]
Steps for correcting age for Prematurity

normal gestation 37-42 weeks
Premature <37 wks
Postmature >42 wks

1- calculating the number of weeks the infant was premature:
40 weeks (term) - birth gestation

2- Number of weeks early = the correction factor

3- chronological age - correction factor = adjusted age for prematurity.
Example

baby gestation weeks 28
actual chronological age=5 months

1- 40 weeks (baseline age for full term gestation) - 28 weeks gestation
   = 12 weeks (3 months premature).

2- 3 months is the correction factor.

3- 5 months (chronological age) - 3 months corrected factor
   = 2 months (adjusted age).
From the table (next page) the baby is preterm <37 wks.
<table>
<thead>
<tr>
<th>Classification</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td><strong>Gestation</strong></td>
<td></td>
</tr>
<tr>
<td>Preterm</td>
<td>week gestation 37&gt;</td>
</tr>
<tr>
<td>Term</td>
<td>week gestation 37-42</td>
</tr>
<tr>
<td>Post term</td>
<td>week gestation 42&lt;</td>
</tr>
<tr>
<td>Classification</td>
<td>Definition</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Birth weight</td>
<td></td>
</tr>
<tr>
<td>Low birth weight</td>
<td>gm 2000&gt;</td>
</tr>
<tr>
<td>Very low birth weight</td>
<td>gm 1500&gt;</td>
</tr>
<tr>
<td>Extremely low birth weight</td>
<td>gm 1000&gt;</td>
</tr>
</tbody>
</table>
Case

- Gada is 8 year old Girl
  - Wt= 15 kg
  - Ht=107 cm
  - parameters
  - requirements

- Tariq is preterm with birth gestation of 30 weeks,
  - Age = 4 month
  - Wt= 6.2 kg
  - Ht= 64 cm
  - parameters
  - requirements
Thank you