A Preschool Nutrition Primer for RDs

Pediatric Nutritional Assessment

NutriSTEP
Nutrition Screening Tool for Every Preschooler
Évaluation de l'alimentation des enfants d’âge préscolaire
Learning Objectives

- Identify possible causes of abnormal nutrition status.
- Collect information to develop an appropriate nutrition care plan.
- Evaluate the effectiveness of the nutrition care plan.
Presentation Outline

- Medical History
- Labs
- Medications
- Anthropometrics – Brief Overview
- Assessing Anthropometrics – Brief Overview
- Estimating Requirements
- Diet History
- Overall Assessment
- Nutrition Care Plan
- References and Resources
Medical History

- Reason for current referral/diagnosis
- Previous illnesses/diagnoses
- Family illnesses/diagnoses (acute or chronic)
- Growth history
  - Assess how the client is growing
  - Identify growth issues (current and/or previous)
  - Calculate BMI and IBW
Lab work

- CBC
- Electrolytes
- Glucose
- BUN & Creatinine
- Albumin
- Calcium, phosphorus, magnesium
- Ferritin
- Other pertinent tests/investigations (e.g. sweat Chloride)
Medications

- Pertinent medications
  - vitamin/mineral supplements
  - antisecretory
  - antiemetic/upper GI motility
  - Antibiotics
  - diuretics

Etc……
Anthropometrics

- Weight
- Standing Height
- Others
  - Head Circumference (< 36 mths)
  - Skin-folds
Weight

- Index of acute nutritional status.
- One time measurement versus serial measurements.
- Toddlers and older children/teens should be weighed with minimal clothing on a standing scale to 0.1 kg.
- Special needs—may need a lift scale or wheelchair scale.
Weight Velocity

- Regain birth weight by 10-14 days old.
- Doubles by 4-6 months.
- Triples by 12 months.
- Infancy is the most rapid period of weight gain (0 – 12 months).
- Adolescence is the second most rapid period of weight gain.
- Preschool and school age is a period of static and steady growth.
Standing Height

- Use when over age 2.
- If unable to stand, use recumbent length or knee height.
- Use calibrated stadiometer.
- Measure to 0.1 cm.
- Consider parental height.
- Consider chronic illness or special health care needs.
Standing Height
Assessing Anthropometrics

1. Know growth chart options-age and sex appropriate, CDC vs WHO.
2. Determine and calculate child’s age in years and months.
3. Choose appropriate growth chart.
4. Plot all indices + wt for length or BMI.
5. Classify stunting and wasting.
6. Classify overweight or obesity.
Growth Chart Options

- 2000 CDC charts (3rd – 97th percentile)
  - Approved for use in Canada in 2004
    - [www.cdc.gov/growthcharts](http://www.cdc.gov/growthcharts)
- National Growth Monitoring Position
  - [www.dietitians.ca](http://www.dietitians.ca)
- Special charts
  - Down’s Syndrome
  - Other
- WHO growth references
  - New as of April 2006
  - Consideration as the NEW standard – collaborative statement available on the Dietitians of Canada site.
WHO Growth Charts

- New global *Child Growth Standards* for infants and children up to the age of five.
- Standards based on 8,440 breastfed children internationally as the norm for growth and development.
- Shows how children *should* grow.
- Detects children or populations not growing properly or under/overweight and may require specific medical or public health responses.
Determine and Calculate Age

- Age to nearest $\frac{1}{4}$ year or Decimal Age (> 2yrs old)

  \[ \text{Decimal Age} = \text{today's decimal date} - \text{birth decimal date} \]

- Converts annual age into a decimal for precision in plotting.
- For children > 2 years old.
- Need decimal age table.
Calculation of Decimal Age

Example: August 28, 2006

Decimal Age
= today's decimal date – birth decimal date
= 2009.159 – 2006.655
= 2.504 years old = 2.5
Choose Appropriate Growth Chart

0 – 36 months

2 – 20 years
Plot All Indices

0 – 36 months
- Weight
- Length
- Head circumference
- Weight for length

2 – 20 years
- Weight
- Height
- BMI
12 mo old

Wt = 11.0 kg
Lg = 75.0 cm
HC = 48.0 cm
16 year old

Wt = 50.0 kg
Ht = 160 cm
16 year old
BMI = 19.5
BMI at 25-50th
Classify

- Normal
- Stunting and/or wasting/underweight
- Overweight or obesity
<table>
<thead>
<tr>
<th>NUTRITIONAL INDICATOR</th>
<th>ANTHROPOMETRIC CUT-OFF VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stunting</td>
<td>&lt; 3&lt;sup&gt;rd&lt;/sup&gt; length/height for age</td>
</tr>
<tr>
<td>Underweight or Wasting</td>
<td>&lt; 3&lt;sup&gt;rd&lt;/sup&gt; weight for length</td>
</tr>
<tr>
<td></td>
<td>&lt; 90% IBW</td>
</tr>
<tr>
<td></td>
<td>&lt; 5&lt;sup&gt;th&lt;/sup&gt; BMI for age</td>
</tr>
<tr>
<td>Overweight</td>
<td>85-95&lt;sup&gt;th&lt;/sup&gt; BMI for age</td>
</tr>
<tr>
<td>Obesity</td>
<td>&gt; 97&lt;sup&gt;th&lt;/sup&gt; wt for length</td>
</tr>
<tr>
<td></td>
<td>&gt; 95&lt;sup&gt;th&lt;/sup&gt; BMI for age</td>
</tr>
<tr>
<td>Head Circumference</td>
<td>&lt; 3&lt;sup&gt;rd&lt;/sup&gt; or &gt; 97&lt;sup&gt;th&lt;/sup&gt; for age</td>
</tr>
</tbody>
</table>
Ideal Body Weight

- Many methods can be used.
- Weight at the same percentile as the child’s height percentile (Moore Method).
- Wt for length at 50th percentile.
- BMI at 50th percentile.
- “Standard Weight” or McLaren Method (weight at 50th percentile for height age).
- \[ \% \text{ IBW} = \frac{\text{actual weight}}{\text{IBW}} \times 100 \]
Weight Age and Height Age

*Weight Age* =
the age at which the current weight hits the 50\textsuperscript{th} percentile

*Height Age* =
the age at which the current height hits the 50\textsuperscript{th} percentile
30 month old

Length = 85 cm

Standard Weight or IBW (~12.2 kg)

Weight = 10 kg
30 mo old
BMI = 13.8

BMI < 5th
IBW
<table>
<thead>
<tr>
<th>Index</th>
<th>Measurement</th>
<th>Plotting</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>10.0 kg</td>
<td>&lt; 3rd</td>
<td>-</td>
</tr>
<tr>
<td>Length</td>
<td>85.0 cm</td>
<td>3rd</td>
<td>Normal</td>
</tr>
<tr>
<td>Head Circ</td>
<td>48.0 cm</td>
<td>10-25th</td>
<td>Normal</td>
</tr>
<tr>
<td>Wt for Lg</td>
<td>-</td>
<td>&lt; 3rd</td>
<td>Underweight/wasting</td>
</tr>
<tr>
<td>BMI</td>
<td>13.8</td>
<td>&lt; 5th</td>
<td>Underweight/wasting</td>
</tr>
<tr>
<td>IBW</td>
<td>~ 12.2 kg</td>
<td>82% IBW</td>
<td>Underweight/wasting</td>
</tr>
</tbody>
</table>
Risks of Malnutrition

- Wasting/underweight
  - Impairment of cognitive development (verbal, spatial and scholastic ability)
  - Aggressive, hyperactive
  - Externalizing problems, conduct disorders
  - Excessive motor activity
- Overweight and obesity
  - Weight related chronic diseases-CVD, DM
  - Respiratory and joint problems
  - Self-esteem, body image concerns
Estimating Requirements

- Energy
- Protein
- Fluid
- Micronutrients
Energy Requirements

- Many different ways !!!!
- RNI’s
- WHO
- BMR
- Kcal/cm
- CUG (Catch-up growth)
- The BEST way…
  - Take regular measurements of growth and energy intake.
RNI’s

- Based on age and gender (after age 7).
- Expressed as kcal/kg.
- Assumes normal activity and no extra stressors.
- If < 90% IBW: use IBW in calculation or use CUG
- If 90 – 110 % IBW: use actual weight
- If >110 % IBW: use IBW in calculation

\[ EER = \text{weight} \times \text{RNI (kcal for age and gender)} \]
# RNI’s

<table>
<thead>
<tr>
<th>Age (term infants)</th>
<th>Energy (kcal/kg/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2 months</td>
<td>100-120</td>
</tr>
<tr>
<td>3-5 months</td>
<td>95-100</td>
</tr>
<tr>
<td>6-8 months</td>
<td>95-97</td>
</tr>
<tr>
<td>9-11 months</td>
<td>97-99</td>
</tr>
<tr>
<td>1 year</td>
<td>101</td>
</tr>
<tr>
<td>2-3 years</td>
<td>94</td>
</tr>
</tbody>
</table>

For > 1 year old.
Use when metabolic demands are increased (e.g. trauma, respiratory, surgery, etc…).
Use when activity level is increased or decreased.
May be used in children with developmental disabilities.
WHO equations are similar.
## BMR (1-20 years)

<table>
<thead>
<tr>
<th>Age</th>
<th>Females (kcal/kg/day)</th>
<th>Males (kcal/kg/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>56.4</td>
<td>57.0</td>
</tr>
<tr>
<td>2</td>
<td>54.3</td>
<td>53.4</td>
</tr>
<tr>
<td>5</td>
<td>50.9</td>
<td>48.4</td>
</tr>
<tr>
<td>10</td>
<td>37.1</td>
<td>38.3</td>
</tr>
<tr>
<td>15</td>
<td>26.0</td>
<td>29.5</td>
</tr>
<tr>
<td>20</td>
<td>24.2</td>
<td>26.4</td>
</tr>
</tbody>
</table>
# BMR Factors

<table>
<thead>
<tr>
<th>Activity</th>
<th>Factor</th>
<th>Stress</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paralyzed/Coma</td>
<td>0.8–1.0</td>
<td>Surgery</td>
<td>1.2</td>
</tr>
<tr>
<td>Bed Rest</td>
<td>1.2</td>
<td>Head Injury</td>
<td>1.3-1.75</td>
</tr>
<tr>
<td>Sedentary</td>
<td>1.5</td>
<td>Hyperkinesis</td>
<td>1.2</td>
</tr>
<tr>
<td>Normal</td>
<td>1.7</td>
<td>Sepsis</td>
<td>1.6</td>
</tr>
<tr>
<td>Athlete</td>
<td>2.0</td>
<td>Trauma</td>
<td>1.35</td>
</tr>
</tbody>
</table>
Kcal/ cm

- Used for children with special needs.
- For 5 – 12 years old.
Catch-Up Growth (CUG)

- May be used when < 90% IBW (wasting/underweight).
- Want 1.5 – 2.0x normal rate of weight gain.

\[
\text{= RNI/kg/d for wt age x IBW for age} \times \frac{\text{Actual weight}}{\text{IBW for age}}
\]
Protein Requirements

- Required for synthesis of new body tissue during periods of growth.
- As such, high needs per kg during infancy, childhood and adolescence.
- Additional protein is not needed for CUG.
- Based on actual weight.
- Use Dietary Reference Intakes (DRIs):
  - 1-3 years: 1.05 g/kg/day
  - 4-8 years: 0.9 g/kg/day
# Fluid Requirements

**Maintenance**

<table>
<thead>
<tr>
<th>Body Weight (kg)</th>
<th>Fluid Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 10 kg</td>
<td>100 ml/kg/day</td>
</tr>
<tr>
<td>11 – 20 kg</td>
<td>1000 ml + 50 ml/kg for each kg above 10 kg</td>
</tr>
<tr>
<td>&gt; 20 kg</td>
<td>1500ml + 20 ml/kg for each kg above 20kg</td>
</tr>
</tbody>
</table>
Micronutrient Requirements

- Requirements are based on age and gender.
- Use Dietary Reference Intake (DRI) tables.
- Recommended that infants/children receive micronutrients from foods.
- Supplement only when:
  - Poor oral intake
  - Clinical deficiencies e.g. iron
  - Increased losses (e.g. Cystic Fibrosis)
  - Restrictive diets (e.g. Vegan)
Diet History

- Purpose is to estimate total energy and protein intake, and identify *anything* lacking, excessive or abnormal.
- Need to be familiar with normal pediatric nutrition including:
  - Health Canada Nutrition For Healthy Term Infants, Jan 2006.
  - Eating Well with Canada’s Food Guide.
  - DC Healthy Start for Life.
- Use 24 hr recall/3 day intake records.
Diet History - Key Questions

• Depends on age and presenting problem.

• Feeding history from birth:
  - Breast vs bottle feeding
  - Introduction to solids
  - Any feeding aversions/difficulties

• Feeding milestones.

• Look at the full 24 hr day (intake during the night? e.g. bottle feeding).

• Eating routine/schedule.

• Allergies, intolerances, avoidances.
Diet History – More Key Questions

- Stools (frequency, color, texture)
- Urine Output (frequency)
- Emesis
- Children/Adolescents
  - Body image
  - Substance abuse
  - Lifestyle/activities
  - Eating routines/habits
Diet History - Social Questions

- What time do they eat, where, with whom?
- Family eating habits, routine.
- Daycare or other caregivers.
- Behaviors at meals.
- Food security.
Overall Assessment

- Summarize:
  - Pertinent points from medical history, medications and lab work.
  - State findings of anthropometric assessment (e.g. stunting, wasting, obesity).
  - State estimate of nutrient requirements.
  - Describe pertinent findings from diet history (e.g. meeting CFG or energy/protein/fluid needs).
  - Describe any social issues related to nutrition.
  - May include assigning a *level of nutrition risk*. 
Nutrition Care Plan

- Developed with parent involvement (and child if appropriate).
- Set nutrition goals.
- Make recommendations to meet goals
  - Oral/enteral/parenteral nutrition
  - Vitamin/mineral supplements
- May request further testing (e.g. lab work, swallow/feeding study).
- Plan to reassess, re-evaluate and revise.
Follow-Up Plan

- Reassess anthropometrics.
- Document changes in nutrition care plan.
- Were recommendations followed?
- Collection of 3-day food record (if suggested from previous visit).
- Reassess and continue with previous plan or implement new nutrition care plan.
Professional/ Parent Resources

- Nutrition Resource Centre: www.nutritionrc.ca
  - NutriSTEP Program and resources.
  - Caregiver Resources e.g. Eat Right Be Active.
- Winnipeg Regional Health Authority Child Health Pediatric Enteral and Parenteral Nutrition Handbook, 2nd ed, Dec 2008. Info: Department of Nutrition and Food Services 204-787-1447 or cginter@hsc.mb.ca.
Acknowledgements


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