FTT vs Malnutrition: The Far Out Difference

Lindsay Arnett, MS, RD, CSP, LD
Clinical Nutrition Specialist II
Children’s Mercy Hospital

Objectives

▪ To understand the difference between failure to thrive (FTT) and malnutrition
▪ To evaluate the primary etiologies of FTT and malnutrition
▪ To demonstrate how to use the nutrition care process to assess patients with FTT and malnutrition
▪ To provide recommendations for evidence-based treatment for FTT and malnutrition

What is Failure to Thrive?

▪ Clinical finding vs diagnosis
▪ Requires serial measures of height and weight
▪ No consensus on the definition
  ▪ “Weight for length or BMI below the 5th percentile”
  OR
  ▪ “Sustained decrease in growth velocity, in which weight for age or weight for length/height falls by two major percentiles over time”
What is Malnutrition?

- “An imbalance between nutrient requirement and intake, resulting in cumulative deficits of energy, protein, or micronutrients that may negatively affect growth, development, and other relevant outcomes”
- Illness vs. non-illness related
- Acute (<3 months) vs Chronic (>3 months)
- Requires only one data point in time

The Path to Defining Malnutrition

Before 2010: Lack of uniform definitions, heterogeneous nutrition screening practices, and failure to prioritize nutrition as part of patient care

April 2010: The Pediatric Malnutrition Definition Workgroup is formed

2013: ASPEN reveals new pediatric malnutrition guidelines

2015: A consensus statement on pediatric malnutrition is released from ASPEN and AND

The Impact of FTT and Malnutrition

- Decreased height potential
- Decreased head circumference
- Increased hospital costs
- Poor outcomes

ETIOLOGY OF FTT AND MALNUTRITION
3 Primary Causes of FTT and Malnutrition

- Decreased intake
- Increased needs
- Decreased absorption

Decreased Intake
- Eating disorders
- Nausea and vomiting (ex: GERD)
- Mechanical feeding difficulties (ex: cleft palate)
- Delayed oral skills development
- Inappropriate formula preparation
- Inadequate opportunities to eat daily
- Neglect or abuse

Increased Needs
- Trauma and burns
- Malignancies
- Congenital heart disease
- Metabolic and genetic disorders
- Some surgeries
- Immune dysfunction or chronic infection
- Hyperthyroidism

Decreased Absorption
- Irritable bowel disease and other GI disease
- Cystic fibrosis
- Biliary atresia
- Celiac disease
- Metabolic and genetic disorders
- Milk protein allergy
- Chronic kidney disease
COMPLETING A NUTRITION ASSESSMENT

Assessment

- Food/nutrition-related history
  - Detailed diet recall
  - Consider 3-day food record or bottle log
- Anthropometrics and review of growth
- Review of labs (if available)

Food/Nutrition Related History

<table>
<thead>
<tr>
<th>Feeding history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
</tr>
<tr>
<td>Family eating patterns</td>
</tr>
<tr>
<td>Preparation of food</td>
</tr>
<tr>
<td>Resources</td>
</tr>
</tbody>
</table>
Food/Nutrition Related History

Personal and past medical history

**Medical conditions**
- Short stature, gastroschisis, reflux, developmental delay, obesity or weight gain, surgical
- Prematurity
- Gastroesophageal reflux, developmental delay, ambulatory vs wheelchair dependent

**Surgeries**
- Shunt placement, heart surgery, etc.

**Illnesses**
- Emergency department and office visits, hospitalizations, parasite exposure, exposure to endemic illnesses (e.g., tuberculosis)

Family medical history

**Gastrointestinal conditions**
- Celiac disease, inflammatory bowel disease, cystic fibrosis

**Parental childhood nutrition**
- Parental malnourishment, picky eating

**Parental height, parental age at puberty**
- Genetic short stature, constitutional growth delay, mid parental height

**Psychiatric illness, substance abuse**
- Alcoholism, substance abuse

**Social history**
- Relationship with peers and family members, bullying

**Living conditions**
- Safety and comfort, ability of parents to provide appropriate nutrition

**Parent-child relationship**
- Parental, foster family, grandparents

**Primary caregivers**
- Adoption, foster care, orphanages

**Stressors**
- Financial and emotional support for child and family, school environment

5 Big Questions

- "Has your child been sick?" (i.e. "Are there any days that your child did not achieve goal feeds/nutrition")
- "How are you mixing the formula? What is your exact recipe?"
- "Are you concerned about your child’s nutritional status?"
- "Why do you think your child isn’t gaining enough weight?"
- "Can you walk me through a normal day of eating/drinking for your child?"

Mid Parental Height

- For boys: \[
  \frac{\text{paternal height} + (\text{maternal height} + 5 \text{ inches or 13 centimeters})}{2}
\]
- For girls: \[
  \frac{\text{maternal height} + (\text{paternal height} - 5 \text{ inches or 13 centimeters})}{2}
\]
- [https://ebmcalc.com/HeightPotential.htm](https://ebmcalc.com/HeightPotential.htm)
“A systematic head-to-toe examination of a patient’s physical appearance and function to help determine nutritional status by uncovering any signs of malnutrition, nutrient deficiencies, or nutrient toxicities.”

Areas to assess for subcutaneous fat loss:
- Orbital region—area around the eye
- Buccal fat-cheek area
- Upper arm—triceps/bicep area
- Thoracic and lumbar region—ribs, lower back, mid axillary line

Areas to assess for muscle loss:
- Temporal region—temporalis muscle
- Clavicle area—deltoid muscle
- Shoulders
- Scapula region
- Legs—quads, thighs, calves

Anthropometrics: MUAC
- Mid-upper arm circumference: “The circumference of the left upper arm, measured at the mid-point between the tip of the shoulder and the tip of the elbow.”
- Can be used as an independent indicator for diagnosing pediatric malnutrition and “should be part of the full anthropometric assessment in all patients.”
- Can be a more sensitive prognostic indicator for mortality than weight-for-height in malnourished pediatric patients.
Anthropometrics: Growth Charts

- Use **WHO growth charts** for children up to 2 years of age
- Use **CDC growth charts** for children >2 year of age
- Use **specialty growth charts** (i.e. Fenton for prematurity, Trisomy 21 growth chart, etc.) as needed
- Remember to correct for gestational age for children born prematurely <37 weeks

Anthropometrics: Z-Scores

- The Z-score is the standard deviation above or below the mean
  - 0 is the same as the 50th percentile
  - ± 1.0 plots at the 15th or 85th percentiles
  - ± 2 at the 3rd or 97th percentiles

Anthropometrics: Using Peditools


Classifying Malnutrition

<table>
<thead>
<tr>
<th>Single Data Point Available</th>
<th>Mid Malnutrition</th>
<th>Moderate Malnutrition</th>
<th>Severe Malnutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight for height z-score ≤2 years</td>
<td>-1 to -1.9 z-score</td>
<td>-2 to 2.9 z-score</td>
<td>≤ -3 z-score</td>
</tr>
<tr>
<td>BMI for age z-score &gt;2 years</td>
<td>-1 to -1.9 z-score</td>
<td>-2 to 2.9 z-score</td>
<td>≤ -3 z-score</td>
</tr>
<tr>
<td>Length or height z-score</td>
<td>-1 to -1.9 z-score</td>
<td>-2 to 2.9 z-score</td>
<td>≤ -3 z-score*</td>
</tr>
<tr>
<td>Mid-upper arm circumference</td>
<td>-1 to -1.9 z-score</td>
<td>-2 to 2.9 z-score</td>
<td>≤ -3 z-score</td>
</tr>
</tbody>
</table>

*Do not use this criteria in patients with chronic diseases such as chronic kidney disease, CP, CF, prematurity. Increased calories may increase fat deposition and not height increase.
Classifying Malnutrition

<table>
<thead>
<tr>
<th>Two or more data points available</th>
<th>Mild Malnutrition</th>
<th>Moderate Malnutrition</th>
<th>Severe Malnutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight gain velocity (&lt;2 years)</td>
<td>&lt;75% of normal for expected weight gain</td>
<td>&lt;50% of normal for expected weight gain</td>
<td>&lt;25% of normal for expected weight gain</td>
</tr>
<tr>
<td>Weight loss (2-20 years)</td>
<td>5% usual body weight</td>
<td>7.5% usual body weight</td>
<td>10% usual body weight</td>
</tr>
<tr>
<td>Deceleration in weight-for-length/height z-score</td>
<td>Decline of 1 z-score</td>
<td>Decline of 2 z-score</td>
<td>Decline of 3 z-score</td>
</tr>
</tbody>
</table>

Classifying Malnutrition

- Use PES Statements:
  - Malnutrition (mild, moderate, severe), (acute, chronic) related to (illness or medical condition, dietary intake, psychosocial factors, inflammation) as evidenced by (2 - scores or percentages).
  - For example:
    - Malnutrition (mild, chronic) related to presumed inadequate energy intake in the setting of complex past medical history including prematurity and cerebral palsy as evidenced by BMI z-score of -1.30.
    - Malnutrition (severe, acute) related to presumed inadequate energy intake in the setting of RSV requiring recent admission as evidenced by 8% body weight loss x3 weeks.

INTERVENTIONS FOR FTT AND MALNUTRITION

- Supplemental beverages
- Feeding structure
- Snacks
- Adding extra calories
- Picky eating
Supplemental Beverages

- Pediasure, Carnation Instant Breakfast, Super milk (8 oz whole milk + 2 tbsp heavy whipping cream), etc.
- How to use supplements to optimize weight gain:
  - Give only 4 oz (1/2 can) at meals and sometimes snacks. Water ONLY in between meals/snacks to encourage hunger.
  - If a child is preferentially drinking their supplement, consider giving them food first for 10 minutes, then Pediasure after.
  - Limit juice to 0-4 oz/day

Ellyn Satter’s Division of Responsibilities

<table>
<thead>
<tr>
<th>Caregiver’s Job</th>
<th>Child’s Job</th>
</tr>
</thead>
<tbody>
<tr>
<td>What food to offer</td>
<td>What to eat</td>
</tr>
<tr>
<td>When to offer food</td>
<td>How much to eat</td>
</tr>
</tbody>
</table>

Feeding Structure Tips

- Offer 3 meals and 2-3 snacks daily.
- Give all meals and snacks at the dinner table or high chair
- Encourage family meals and set a good example
- Limit meals to 30 minutes and snacks to 20 minutes
- Do not make your child a separate meal/snacks
- Ensure there is at least one food on the table you know they will accept
- Let children feed themselves

Feeding Structure Tips

- Do not label food as “good” or “bad”
- Do not use food as a reward of punishment
- Do not pressure, force or bribe a child to eat
- Let children help in the kitchen
- Present food from all food groups
- Do not allow distractions during meals/snacks (no phone/screen policy)
- It is OK to say “no” or “not yet” to children
Sample Feeding Schedule

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>What to Offer</th>
<th>Beverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30 AM Breakfast</td>
<td>3-4 food groups</td>
<td>4 oz supplement</td>
</tr>
<tr>
<td>10 AM Snack</td>
<td>2-3 food groups</td>
<td>4 oz supplement</td>
</tr>
<tr>
<td>12:30 PM Lunch</td>
<td>3-4 food groups</td>
<td>4 oz supplement</td>
</tr>
<tr>
<td>3:30 PM Snack</td>
<td>2-3 food groups</td>
<td>4 oz supplement</td>
</tr>
<tr>
<td>6 PM Dinner</td>
<td>3-4 food groups</td>
<td>4 oz supplement</td>
</tr>
<tr>
<td>8 PM Snack</td>
<td>2-3 food groups</td>
<td>4 oz supplement</td>
</tr>
</tbody>
</table>

Snacks are “Mini Meals”

- Limit snacks to every 2.5-3 hours (no more than 3 per day).
- Do not allow grazing.
- Snacks should contain 2-3 food groups.
- Try to include one “high calorie” food with snacks.

Protein

- Whole milk
- Fruit flavored, full fat yogurt
- String cheese
- Peanut, almond or cashew butter
- Cheese slices/cubes
- Cottage cheese
- Boiled egg

Allergen Friendly**:
- SunButter
- Coconut yogurt with added protein
- Seeds (sunflower, chia, flax, pumpkin)

Fat

- Butter
- Olive oil
- Cream cheese
- Cheese
- Cream
- Ranch dressing

Add Extra Calories

- Butter or oil (1 tbsp=100-120 kcals)
- Cream cheese (1 tbsp=50 kcals)
- Heavy whipping cream (1 tbsp=50 kcals)
- Cheese (1 oz=90-110 kcals)
- Full fat yogurt (4 oz=140 kcals)
- Avocado (1/2=160 kcals)

- Nut butters, cookie butter or Nutella (1 tbsp=90 kcals)
- Chia seeds, flaxseeds (1 tbsp=50-70 kcals)
- Maple syrup (1 tbsp=50 kcals)
- Chocolate syrup (1 tbsp=50 kcals)
- Nuts (1 oz=160 kcals)
Add Extra Calories

- Hummus (1 tbsp=25 kcals)
- Full fat cottage cheese (1/2 cup=100 kcals)
- Bagels (1/2 bagel= 25 kcals)
- Oats (1/2 cup=150 kcals)
- Beans (1/2 cup=100 kcals)

- Eggs (1 egg=80 kcals)
- Pancakes (1 4” pancake=85 kcals)
- Duocal (1 scoop=25 kcals)
- Benecalorie (1 container=330 kcals)

Practice With Extra Calories

Picky Eating vs Problem Feeding

- Picky eaters
- Problem feeders

<table>
<thead>
<tr>
<th>Picky Eaters</th>
<th>Problem Feeders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Somewhat fussy but without more than 3 or 4 foods</td>
<td>Insufficient variety of foods and avoid foods they don’t like</td>
</tr>
<tr>
<td>Mealtime meal setting an unappealing affair for both</td>
<td>Meals become less appetizing as they become more educated</td>
</tr>
<tr>
<td>Activities new format, new foods, etc.</td>
<td>Copyright style with new foods</td>
</tr>
<tr>
<td>Relax and let foods in-suction until 6-8 months</td>
<td>Move more from acceptance criteria towards rejection</td>
</tr>
<tr>
<td>Respected meal structure (meal and food presentation)</td>
<td>Relax with erratic patterns or changes in routines</td>
</tr>
<tr>
<td>Taste buds with the feeding but respond with actual family meal</td>
<td>Other side serves, usually does not want family meals</td>
</tr>
<tr>
<td>Sometimes calculus “yucky” at meal and skills</td>
<td>Regularly asked or “yucky” or multiple meal resistances</td>
</tr>
</tbody>
</table>

Feeding Exposure Therapy

- Stop talking about food in “likes” and “dislikes”
- Remind families that their child is still too young to pass strong judgements about food
- Have a positive, curious and explorative attitude about new foods

- Ask kids to use adjectives to describe their food
- Ignore behavior when kids say food is “nasty,” throw a tantrum, etc.
- Praise and celebrate children when they interact with new foods
- Introduce new or non-preferred foods in many different ways
Feeding Exposure Therapy

- Ask children to interact with foods in one of 5 ways:
  - Tolerate it on their plate
  - Touch it
  - Kiss or lick it
  - Eat one bite
  - Eat more than one bite

Picky Eating

IMPLICATIONS FOR
FUTURE PRACTICE

- Nutrition professionals must consider the impact of language (FTT vs malnutrition) on our assessment.
- It is critical to understand the etiology of malnutrition or FTT to select an appropriate treatment.
- A thorough and informative assessment can be completed, even with limited time and resources.
- Nutrition professionals can provide targeted interventions to significantly decrease the prevalence of FTT and malnutrition.
References


Questions

Lindsay Arnett, MS, RD, CSP, LD
Clinical Nutrition Specialist II
Children’s Mercy Hospital
larnett@cmh.edu