Neglect

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Forms of neglect

- Educational
- Medical
- Physical
- Nutritional

Educational neglect

- When child not enrolled in school
- Fails to attend school
- Special educational needs not being met

Medical neglect

- Nonadherence with medical recommendations
  - For example, a severe asthmatic not getting or taking prescribed medications
- Delay or failure in getting health care
  - Such as failing to treat a severe burn, infection, or other problem that a prudent caregiver should recognize
- Refusal of medical treatment
  - E.g., refusal of medical treatment on religious grounds, or because alternative treatment is preferred

Physical neglect

- Inadequate protection from environmental hazards
- Inadequate supervision
- Inadequate hygiene
- Failure to provide adequate shelter
- Inadequate clothing

Picture of dirty house
Home with multiple hazards to health and well-being, such as garbage, items piled high, dirty objects, and surfaces.
Dirty house
Kitchen with debris, soiled surfaces which impairs ability to use the space in the manner intended

Failure to thrive (FTT)
- Growth failure occurs in 10% of young children
- Represents 1 - 3% of all pediatric admissions
- It crosses all socioeconomic levels
- Most failure to thrive (FTT) is mixed in etiology; even organic FTT often includes a non-organic component
- Nonorganic etiology accounts for 70%-80% of growth failure

Common dietary pitfalls in FTT
- Overdilution of formula
- Large amounts of cereal in bottle
- Excessive fruit juice, soda, or water
- Inappropriate food texture
- Infrequent feeds (quiet children)
- Lack of established feeding times
- Lack of high chair
- “Grazing” (eating small amounts through day)
- Distractions from feeding
- Feeding struggles

Social problems in malnutrition
- Family disorganization
- Social isolation
- Post-partum or other depression
- Substance abuse
- Violence
- Parental stress
- Poverty
  - food shortages at end of month
  - lack of cooking facilities
  - crowding, leading to distractions

Physical examination:
Signs of malnutrition
- Decreased pulse, temperature, BP
- Decreased activity, apathy, hypotonia
- Decreased adiposity (fat deposition)
- Prominent ribs and bone structures
- “Old” skin, pallor
- Sparse fragile hair
- Heart murmur from anemia
- Protuberant abdomen, organomegaly

Multiple signs of malnutrition
Note the prominent ribs, loose skin folds, and lack of subcutaneous fat in this 8 month old male who presented for care weighing 11 pounds (average weight for a 6 week old child). He could not sit, roll, or crawl. He also had contractures at his elbows and knees (arms and legs could not be fully extended) due to being wrapped for long periods.
Physical examination: Growth assessment

• Weight, height, head circumference, and weight for height are the growth parameters measured on growth curves
  – Head circumference is a measurement which assesses brain growth
• Doctors plot measurements on growth charts
• Serial measurements are crucial; one point on a graph is difficult to interpret
• Patterns of growth may suggest specific diagnoses

Evaluation of growth charts

• Appropriate growth chart must be used (e.g., male, female, premature, cerebral palsy, Down syndrome)
• Pattern of growth must be evaluated carefully, with consideration of underlying medical conditions
• Sudden changes must be evaluated, may provide clue to underlying problems
• There is a wide range of normal values for each age range
• Bold line in center of the shaded section is the average measurement (weight, height, or head circumference) for a child of that age

The child with failure to thrive:
1) has not taken,  
2) has not been offered, or  
3) has not retained adequate calories for growth.

Percent of median weight for age as an indicator of severity of malnutrition

75-90% of median = mild  
60-74% of median = moderate  
<60% of median = severe

For instance, a 12 month old girl who weighs 7.3 kg has a median (50th percentile) weight of 9.7 kg. She is at 75% of her median weight, indicating mild FTT.

Case 1: Five month old child admitted for malnutrition
This 5 month old child born one month prematurely weighed 7 pounds 12 ounces when he was admitted for failure to thrive; this is the average weight for a 1 week old infant. Note several features of malnutrition, including prominent ribs, distended abdomen (after refeeding), loose skin folds on arms and legs.
Signs of malnutrition

Additional signs of malnutrition are the prominent hip, sacrum, and spine bones, along with a lack of subcutaneous fat. He was not being fed by his mother, despite an adequate supply of formula through WIC. By the time of his admission, his suck reflex was uncoordinated, and he required speech therapy to ensure adequate oral intake.

Growth chart for child in Case 1
This growth chart shows the length (upper chart) and weight (lower chart) for the child in Case 1. Although the child’s growth crossed growth percentiles in the first month of his life, his weight and length remained in the normal range for that time period. However, by the time of his hospital admission, he was well below the normal growth curve for weight and length. Note that the charting of his growth parameters is corrected for his 1 month of prematurity.

Growth chart for child in Case 1
This is the graph of head circumference in Case 1. Measurement of head circumference is a proxy for measuring brain growth. His head circumference crossed growth percentiles in his first month of life, but remained in the normal range. However, by the time of his hospital admission at 5 months of age (corrected age of 4 months plotted on graph), he was below the 3rd percentile for head growth. This failure of head growth indicates that the child will have permanent consequences from the malnutrition he suffered in early infancy.

Case 2: Three year old child with kwashiorkor
Kwashiorkor is protein-energy malnutrition, most commonly seen in countries experiencing severe food shortages. Children with kwashiorkor typically have very thin arms and legs, with swelling (edema) most often seen at their stomachs and lower legs. This child was extremely weak and edematous (swollen) at hospital presentation, with severe edema affecting most of his body. He lost 7 pounds in water weight over the course of a week in the hospital, and was found to weigh 20 pounds, which is the average weight for an 8 ½ month old infant. He had been primarily breastfed until his admission. Note the prominent ribs and lack of subcutaneous fat on his arms. His hair was fine and thin, and was easily shed from his scalp. Petechiae are present because of extensive edema.

Severe edema of feet
This 3 year old child had been primarily breast fed through his entire life, with only crackers, juice, and rice introduced to his diet. He had severe edema affecting his entire body.

Lack of subcutaneous fat on buttocks
Although his mother thought he was “chubby” due to his edema, he lacked subcutaneous fat throughout his body.
MRI showing cerebral and cerebellar atrophy (decreased brain tissue) in Case 2
This 3 year old child could not stand unassisted, could not walk, and was unable to change positions (i.e., from kneeling to standing) without assistance. He had fewer than five words in his vocabulary. The infant and toddler years are typically a time of rapid weight gain, brain growth, and linear growth. When a child suffers severe nutritional deprivation, the brain misses this critical time period of rapid growth, resulting in irreversible brain damage. This damage results in permanent consequences for the child, including cognitive impairments, emotional problems, learning disabilities, and poor impulse control. This child will have lifelong consequences of the severe neglect he experienced.

Growth chart for length and weight: Case 2
This child had never visited a doctor, and so there were no previous measurements of growth parameters for comparison. However, his weight and length were well below the third percentile for his age.

Growth chart of head circumference: Case 2
Despite the presence of cortical and cerebellar atrophy on his MRI, this child’s head circumference was above the 50th (average) growth percentile for head circumference in a child of his age. However, when the head circumferences of his siblings were measured, they were at approximately the 95th percentile for their respective ages. Thus, he has comparatively less brain tissue than his immediate family members. This brain tissue loss means that he will have lifelong consequences because of his severe malnutrition.

Case 3: Four month old presenting with seizures and hyponatremia
This infant presented for care with seizures; electrolyte levels revealed that his sodium was extremely low. His mother had been adding excessive water to his formula to stretch the supply received from WIC. His weight was 10 pounds (the average weight for a one month old infant) at admission.

Examination features
Note the prominent ribs (previous slide) and hip bones; little fat on his buttocks.

Examination features
Loose skin folds are seen on his trunk and extremities. He also had a worried expression on his face, and did not want to lose sight of the examiner when turned; he kept turning his neck backward.
Growth charts for weight and length: Case 3

This growth chart reveals that, although this infant was at the average length for a two-month-old, by the time of his hospital admission at four months of age, he was at the 10th percentile for length. His growth percentile for weight has changed as well. At birth, he was at the 25th percentile for weight, but by age four months, was at less than the third percentile.

Head circumference plot: Case 3

A plot of this child's head circumference reveals that he was at the 50th percentile at the time of his hospital admission. According to records from his pediatrician's office, his head growth had consistently been at the 50th growth percentile throughout his life.

When a child experiences failure to thrive, the first growth parameter affected is the weight. With continued nutritional deprivation, the linear growth declines. When there is severe or prolonged deprivation, the head circumference is affected, meaning that the child will suffer permanent deficits due to nutritional deprivation (such as in Case 2).

Fatal Starvation

Although rare, starvation which results in the death of a child can occur. Below are listed two references which can aid a clinician in making an assessment regarding the approximate number of days food was withheld, and in calculation of daily caloric requirements needed to prevent death.


Indications for hospitalization

- Below birth weight at 6 weeks
- Infant less than 6 months
- Head circumference falling off curve at < 6 months
- Signs of abuse/ gross physical neglect
- Failure of outpatient therapy
- Pursuit of organic diagnosis
- Home unsafe/ caretaker inadequate

Types of Nonorganic Failure to Thrive

- Neglectful
- Accidental
- Poverty-related
- Deliberate starvation

Systematic study of the causes of failure to thrive among children admitted to a hospital revealed a medical cause approximately 30% of the time.

Why can failure to thrive cause permanent neurologic deficits?

Berwick, Arch Dis Child 57:347 1982
Early brain development

- Head circumference measurements are a proxy for brain growth
- Brain growth accelerated early in life
  - Brain is ¼ adult size at birth
  - Brain is 80% of adult size by age 3
  - Brain is 90% of adult size by age 5
- Majority of brain growth in early childhood results from synaptic or dendritic growth (growth of connections between brain cells) and myelination (coating of nerve axons with waxy substance)

Dendrite formation

- At birth, neurons (brain cells) are present, but poorly connected
- A substantial portion of brain growth in early childhood results from formation of dendrites
  - Dendrites sprout from nerve cell
  - Dendrites connect (synapse) with other neurons
  - Each neuron develops hundreds of dendrites over time
- Exuberant growth period results in massive burst of synapse formation after birth
- Synapse formation continues into early childhood
- Pruning of synapses begins in middle childhood, continuing through adolescence

Myelination

- Myelination is the other process beginning early in childhood
  - Myelin is a fatty coating on the axon of the neuron
- Myelination of nerve cell axons results in faster signal processing
- This process continues into the early 20s, sometimes up to age 30
- Malnourishment is the only environmental factor known to disrupt myelination

Outcomes in failure to thrive

- Growth
- Emotional Development
- Intellectual Development

Growth

- Treated adequately most children catch up to some degree
- On follow-up most children are smaller than peers
  - 25-30% have weights and heights below the 3rd percentile
  - Some children reach near normal growth after years of intensive therapy
- Severe growth failure leads to decreased brain growth and smaller head circumference
Emotional Development

• High incidence of emotional disorders
• Significantly lower social maturity
• Significantly more behavior problems
  – Impulsive, disorganized
• Increase in psychiatric services
• Insecure attachments
• Deficits in social responsiveness

Intellectual Development

• Decreased IQ
• Significant school difficulties
• Delayed speech
• Delayed conceptual thinking
• Decreased language and reading skills
• Decreased math skills
• Repeated grades
• Poor impulse control
• Poor attention span
• Poor memory

Other Outcomes

• Impaired immunocompetency (ability to fight infections)
• Combination of neglect and FTT causes worse cognitive outcome than nutritional deprivation itself (Mackner CAN 1997)
• Early postnatal FTT is a risk factor for serious future parenting deficiencies (Skuse J Med Screen, 1995)

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