Child Health Nursing
Partnering with Children & Families

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Nutrition

Chapter 9
Nutrition Concepts
Major dietary components

Nutrition is the taking in food and assimilating it metabolically for use by the body.

- Carbohydrates
- Proteins
- Fats
Carbohydrates

• Energy source
• 50% of daily calories
• Digestion and conversion
• Fiber is indigestible carbohydrates which ensures healthy movement of fecal contents through the bowel.
Proteins

- Amino acid compounds
- 9 Essential and 12 nonessential amino acids
- Catabolism and anabolism
- Nitrogen balance
- Deficiency disorders
Proteins are constantly being broken down and synthesized.

Protein balance = Nitrogen balance
Fats

- Energy source
- Cellular processes and blood clotting
- Fatty acids
  - Saturated
  - Unsaturated
    - Monounsaturated
    - Polyunsaturated
Glycemic Index

• The blood glucose response to 50g of carbohydrate from any specific food as compared to the glucose level after ingestion of white bread.

• Low glycemic index has been found to have beneficial effects such as reducing serum lipids, insulin levels, and improving serum glucose control.
Nutritional Needs of the Infant Differ from adults

- Increased energy expenditure
- Rate of growth: double birth weight by 5 months, triple in 1 year
- New growth
- Body composition
- Organ size and immaturity
- Physiological changes
Nutritional Needs: Preterm and Small for Gestational Age Infants

- Immature body systems
- Medical problems
- High calorie/kg needs: may need up to 140 kcal/kg/day
  - Basal energy needs: 50-160 kcal/kg/day
  - Growth needs: 120 kcal/kg/day for enteral feeds; 90 kcal/kg/day for parenteral feeds
  - Catch-up needs/illness needs: up to 140 kcal/kg/day
- Protein, fat, and fluid needs
Nursing Strategies for Preterm and Small for Gestational Age Infants (continued)

• Specialized feeding methods
  – Parenteral nutrition
  – Gavage feedings
  – Transition to oral feedings

• Assessment of tolerance and growth
Nutritional Needs of the Term Newborn

- Infants need minimum 120 calories/kg/day to maintain weight and grow.
- 20 cal per ounce is the usual calories found in formula.
- Feedings per day q 3 hours = 8 feedings per day
  - q 4 hours = 6 feedings per day
• How much formula would an infant who weighs 4.3 kg need at each feeding if they feed every 4 hours?
1. Infant weight in kg is multiplied by 120 calories / number of feedings per day.
   Baby weight = 4.3 kg.

2. Calories needed per day = 4.3 x 120
   Calories needed per day = 516 calories per day

3. Calories needed per feeding = 516 / 6
   Calories needed per feeding = 86

4. Ounces per feeding = calories needed per feed / number of calories per ounce of formula
   Ounces per feeding = 86 / 20
   Ounces per feeding = 4.3
Nursing Strategies for Preterm and Small for Gestational Age Infants (continued)

• Breastmilk
  – components
  – advantages

• Human milk fortifiers

• Formula
What are the advantages of breastmilk?

- Nutritional
- Practical
- Psychological
- Immunological
- Physiological

breast feeding should be continued for at least 6 months
Contraindications to breastfeeding

- Chemotherapy
- Active untreated maternal TB
- Maternal HIV/AIDS
- Maternal primary herpes in the breast
- Certain medications (chloramphenicol)
- Use of alcohol and recreational drug abuse
Formula Feeding Infants Age Newborn to 6 Months

• Types of formulas
• Formula preparation and use
• Specialized formulas for specific needs (PKU, allergies)
• Nursing strategies
  – Education
  – Parent-infant relationship
  – Prevention of early childhood caries
Introducing solid foods

• By the time an infant is 4-6 months old, their swallowing mechanisms have developed sufficiently enough for them to be started on solid foods.

• Readiness for solid foods
  – Extrusion reflex, swallowing
  – Sitting skills
  – Interest
Infants Age 6 to 12 Months
developmental readiness

• Initial introduction of foods
  – Appropriate first foods: rice cereal
• Weaning occurs at 12 months
• Longer bottle feeding increases
  – Dental caries
  – Otitis media
  – allergies
Feeding 9-12 months

- Finger foods
- Peeled fruits
- Cheese and soft cooked vegetables
- No peanuts, raw hard vegetables
- Avoid salt, sugar seasonings
- Very soft table foods that are high protein foods contribute to their growth potential.
- Carbohydrates and fats contribute to meeting their energy requirements
- Introduce cup drinking gradually
Specific nutrient requirements of infant

- No vegetarian diet under 2 years
- Whole milk
- Fluoride supplements at 6 months if not in water
- Iron enriched cereals should be started first
- New foods added gradually
- Start vegetables before fruits
- Add pureed meats fish, poultry and egg yolk (not white)
- No egg whites until after 12 months
- Avoid desserts
- Commercial vs. home made foods
- NO HONEY BEFORE 1 YEAR Infant botulism
Nutritional Needs of the Toddler

• Remember developmental level
  – Goal is to gain control of bodily functions

• **Physiologic anorexia**

• Nutritional needs
  – Restrict fat to less than 30% of calories
    • Switch to low fat milk (2%)
  – Adequate protein
Feeding pattern Toddlers

- Intake patterns
  - Meals and snacks
  - Self feeding
  - Choices
  - Milk and juice intake

- Reward appropriate behavior
  - Parents may give toddlers snacks to make up for missed meals
What is the most common chronic disease of childhood?

5 times more common than asthma?
Dental disease

www.watchyourmouth.org
What causes dental decay?
bacteria
• What are the complications of dental disease in children?
• Periodontitis is associated with cardiovascular disease, stroke and bacterial pneumonia.

• Pregnant women with periodontitis are at increased risk for delivering preterm and low birth weight infants.
• What percent of third graders in Massachusetts have dental disease according to a recent study?
• What are dental sealants and when are they applied to children’s teeth?
Dental Sealants

• Dental sealant is a plastic, professionally-applied material that is put on the chewing surfaces of back teeth to prevent cavities. Sealants provide a physical barrier so that cavity-causing bacteria cannot invade the pits and fissures on the chewing surfaces of teeth.

• Sealants are applied after the permanent teeth erupt.
Nutritional Needs of the preschooler

- Food jags
- Socialization (Associative play)
- Help with food preparations
- Dental care
- Meal and snack patterns
- Nutritional requirements
Nutritional Needs of the school age child

- Appropriate food choices
- School involvement
- Growth Spurts
- Dental Care
  - WATCH YOUR MOUTH
Nutritional Needs of the adolescent

• Growth rate
• Calorie needs
  – Males
  – Females
• Mineral and vitamin needs
• Food choices
Nutritional Assessment

• Family history
• Developmental history
• Medical history
• Physical examination of growth parameters
  – Height
  – Weight
  – Head circumference
Assessment of Growth

- Measure using appropriate tools
- Use of gender and age specific growth charts
- Use culture or condition specific growth charts
Nutrition assessment includes physical assessment and lab findings

- Hematology
  - Hemoglobin
- Blood Chemistry
- Lipid Profile
- Renal and liver function tests
Nutrition Assessment

- Dietary Intake
- 24 hour recall
- 3 day food history
- Genogram to recognize nutritional risk (heart disease and hypertension)
Childhood hunger
Overweight and Obesity

• Increasing incidence
• Developmental influences
• Definitions
  – Body mass index
  – Risk at 85\textsuperscript{th} percentile
  – Specific risk groups
Factors influencing obesity

- Genetics
- Psychological
- Environment
Influencing factors

- GENETICS
- Exercise patterns 20% of children exercise < 2 times per week
- Television and screen time
- Percentage of calories as fat
- Snacking and fast food
- Fewer meals with family
- Media focus on children “toxic environment”
Pathways to obesity

Genetics allow it

Environment facilitates it

Psychology exacerbates it
Obesity by the Numbers

• Overweight US adults 65%
• US adults with obesity 30%
• US adults with extreme obesity 5%
• Increase in obesity since 1960 300%
• US children at risk for overwt 25%
• Overweight (+obese) US children 15%
• Increase in obesity since 1960 300%
Overweight and family history

• When a child has one obese parent, chances of the child being overweight are increased by 220%. In families where both parents are overweight, the incidence of obesity in children increases by 320%. Finally, the child who has obese parents, and is overweight as an adolescent has about an 80% risk of being an obese adult.
Definitions of Obesity and Overweight

Body Mass Index (BMI) = weight/(height)^2 kg/m^2

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<tr>
<th>Group</th>
<th>BMI</th>
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<tr>
<td>Normal</td>
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<tr>
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<td>25-30</td>
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<td>Obesity</td>
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<tr>
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<td>30-35</td>
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<tr>
<td>Class II</td>
<td>35-40</td>
</tr>
<tr>
<td>Class III</td>
<td>&gt;40</td>
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Other medical causes of obesity

- Hypothyroidism  test TSH, free T4
- Cushings disease  urinary free cortisol
- Prader Willi  DNA testing
- Drugs that treat other childhood conditions (Psychiatric drugs)
AAP recommendations for obesity prevention

• Calculate and plot BMI annually
• Identify and track patients at risk
  – Family history, socioeconomic, environmental factors
• Encourage and support breastfeeding
• Recognize and monitor risk factors for obesity related diseases in childhood
Obesity related diseases in childhood

- Sleep apnea
- Metabolic complications
- Psychological assessment
Treatment of obesity

• Medical treatments and referrals
• Nutrition and behavioral counseling
• Treat family
• Nonjudgmental support
  – Focus on concern for health not appearance
Treatment/ practical applications in young children

• Focus on family environment

• Positive reinforcement

• Encourage natural satiety mechanisms
  – No “clean plate club”

• Support a positive body image
  – Discuss strength and health, not weight and appearance
Treatment/ application to adolescents

- Physical activity
- Peer pressure
- Encourage autonomy
- Accept limitations
Treatment for severe obesity

- Medications
- Surgery
  - Appropriate only for most severe disease
  - Gastric bypass
- Currently the intervention with the greatest long-term success rates
Treatment recommendations

• Discourage food as a reward
• Encourage healthy eating patterns at home and school
  – Family meals at the table
• Plan for small changes one at a time
• Diet should be one that maintains weight stability and promote slow weight loss
• Decrease screen time to 2 hours daily
• No TV in bedroom
• No “supersizing” at fast food restaurants
Specific Deficiencies

• Calcium
• Iron
• Vitamin D : RICKETS
• Folic Acid
  – Prevention of neural tube defects and cleft defects
Protein Energy Malnutrition

Protein deficiency

Kwashiorkor

• edema
• Large abdomen
• Rounded faces
• Scant, depigmented hair
• Skin changes
• Decreased serum protein

Marasmus

Together they are referred to as Protein-energy malnutrition
Pica

- Ingestion of nonfood substances or atypical ingestion of foods
- Pregnant women and young children
- Commonly ingested substances
  - Lead paint
  - Soil contaminated by lead-based gas fumes
- Associated nutrient deficiencies: The association with anemia is so strong, most pts with anemia will admit to pica.
- Treatment
Feeding disorder of infancy and early childhood

• Failure to eat
• Poor weight gain
• Behavioral characteristics
Failure to thrive

• Organic incidence
  – Causes
  – Treatment

• Nonorganic incidence (feeding disorder of infancy and early childhood)
  – Risk factors
    • Parents
    • Infant/child
Failure to Thrive (continued)

• Management
  – Assessment and case finding
    • Infant/child and family history
    • Parent (caregiver)-child interaction
    • Adult and feeding behaviors
  – Nursing diagnoses
  – Planning and intervention
    • Monitoring intake and growth
    • Teaching nurturing and feeding strategies
    • Observation of feeding and other interactions
Failure to Thrive (continued)

- Referral for home visits and community support evaluation
  - Growth and development
  - Parent/caregiver-child relationship
Nutritional Support

• Sports: well balanced, fluids, sports drinks, calories
• Vegetarianism: vegans
  – Check for vit D, calcium, B12, iron, fiber, calories, protein, and fat deficiencies
• TPN used for children at risk for severe malnutrition. Sterile nutritious solution infused through a central line. Fluids include glucose, electrolytes, vits, and protein
• Check for infection and air embolism
TPN nursing guidelines

- Sterile technique
- Should not be used for any other purpose
- External tubing should be changed q 24 hours
- Dressings changed q 48 hours