Life Span
Nutrition & Assessment

Student Manual

Developed for the Nutrition Assistant Program
at
City College of San Francisco

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Preface

This manual was written for students in the Nutrition Assistant Program to be used in the course *Life Span Nutrition and Assessment*. *Discovering Nutrition* textbook by Paul Insel, R. Elaine Turner, and Don Ross, 2nd edition, 2006, will be used as supplemental reading.

Eighteen lessons are organized into six sections: Introduction and Basic Skills, Nutrition and Assessment in Pregnancy and Lactation, Infancy and Childhood, Nutrition and Assessment of Adults 18 to 60 Years, Nutrition and Assessment in Later Years. Sections II to VI include nutrition screening parameters for each age group. Intermediate and in-depth levels of nutrition assessment are not included.

Each lesson includes the following: learning objectives, subject matter for discussion, classroom activities and assignments. The subject matter covered provides a basic knowledge from which the nutrition assistant student can draw upon and apply in field experience training.
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Lesson I-1

INTRODUCTION AND BASIC SKILLS

Introduction to Nutrition Assessment

OBJECTIVES:

In this lesson, the student will:

1. Learn the importance and uses of nutrition assessment.
2. Identify conditions/factors affecting nutritional status.
3. List the two categories of malnutrition, their forms and/or causes.
4. Identify the four components of a complete nutrition assessment.
5. Differentiate between nutrition screening and nutrition assessment.

ASSIGNMENTS:

I. DEFINITION

*Nutrition Assessment* is the evaluation of the nutritional status of individuals or populations through measurements of food and nutrient intake and evaluation of nutrition-related health indicators.

*Nutritional Status* indicates the degree to which physiologic needs for nutrients are being met.

II. IMPORTANCE OF NUTRITION ASSESSMENT

Nutrition assessment identifies current nutritional status, nutrient requirements, and nutritional risk, if any. This information is important to:

- identify those at risk for nutritional deficiencies or excesses and promote early intervention.
- provide optimal nutritional care and counseling to clients/patients.
- provide a baseline data to monitor and measure outcome of nutrition intervention.

III. CONDITIONS AFFECTING NUTRITIONAL STATUS

A. Inadequate intake:
- inadequate calorie and protein
- lack of appetite (anorexia)
- inability to feed self
- food allergies
- treatment side effects
B. **Inadequate absorption:**
- side effects of drug therapy
- parasites
- surgical removal of bowel
- chronic gastrointestinal disorders; e.g., celiac disease, regional enteritis, etc.

C. **Defective utilization:**
- metabolic dysfunction; i.e., organ failure
- inborn errors of metabolism, e.g., PKU
- hepatic or renal insufficiency
- drug interference with nutrients

D. **Increased excretions or losses**
- vomiting
- diarrhea
- increased transit through GI tract
- irritable bowel syndrome
- draining fistulas/abscesses

E. **Increased requirements:**
- fever
- infection
- trauma
- stress
- pregnancy
- growth
- burns
- sepsis
- hyperthyroidism
- malignancy
- surgery

**IV. CATEGORIES OF MALNUTRITION**

Malnutrition is lack of proper nutrition. The Jelliffe monograph, published in 1966 identified four forms of malnutrition.

A. **Undernutrition** resulting from lack of sufficient food over a period of time
B. **Overnutrition** caused by an excess of food over time.
C. **Specific deficiency states** resulting from lack of individual nutrients.
D. **Nutrient imbalances** caused by disproportionate amount of required nutrients over a period of time.

There are two categories of malnutrition:
A. **Primary malnutrition** refers to inadequacies or imbalances in the diet, in either the quality or quantity of foods eaten. This category is not related to any disease or disorder. Examples: iron deficiency anemia due to inadequate intake of foods rich in iron; overweight due to food intake in excess of energy use; overuse of vitamin or mineral supplements.

B. **Secondary malnutrition** refers to malnutrition that results from disease or disability. It is disease-related malnutrition. Examples of conditions predisposing to secondary malnutrition include cardiovascular disease, diabetes mellitus, cancer, AIDS, mental illness, dental problems, diseases with chronic fever, drug or alcohol addiction. Secondary malnutrition results from these diseases due to one or more of the following causes:

- malabsorption
- anorexia
- increased metabolism (hypermetabolism)
- metabolic dysfunction
- organ failure
- side effects of treatment

V. **COMPONENTS OF NUTRITION ASSESSMENT**

A complete nutrition assessment includes:

A. **Anthropometric data** — measurements of the human body which indicate growth and development. Anthropometric data is most valuable when accurately measured and recorded over a period of time. These measurements include height or length, weight, head or arm circumference and skinfold.

B. **Biochemical data** — analysis of blood, urine, and other body tissues provides useful information about nutritional status. Examples include serum albumin, hemoglobin, hematocrit, blood levels of vitamins or minerals, etc.

C. **Clinical data** — includes a complete physical examination and a medical and psychosocial history, i.e. factors that influence nutrient intake like income, housing, family size, physical activity, use of alcohol, medications and other actors that influence nutrient utilization.

D. **Dietary data** — includes foods and quantities eaten, eating habits, accessibility of food, cultural and socioeconomic factors that affect selection of food.

NOTE: The components of nutrition assessment can be easily remembered by the acronym, “ABCD”.
VI. NUTRITION SCREENING VERSUS NUTRITION ASSESSMENT

Nutrition Screening (also referred to as screening for nutritional need) is the process of recognizing the presence of factors known to be associated with nutrition problems for the purpose of identifying individuals who are at nutritional risk. Nutrition screening can be done by any member of the health care team, such as the dietitian, dietetic technician, nutrition assistant, or nurse.

Characteristics of the Nutrition Screening Process:
- can be completed in any setting, e.g. clinic, hospital, meal sites, etc., through personal interview and/or using data in client’s chart,
- facilitates completion of early intervention,
- includes the collection of relevant data on risk factors and the interpretation of data for intervention and treatment,
- determines the need for a more in-depth nutrition assessment, and is cost effective.

(Refer to examples of nutrition screening forms.)

Minimal nutrition screening done in some clinics or other facilities include height, weight, change in appetite, hemoglobin, hematocrit, blood pressure, cholesterol and smoking/alcohol habits. This information is used to screen for medical/nutrition risks such as overweight, underweight, anemia and cardiovascular disease. Data for the individual are compared to standards to classify the level of nutritional risk: low risk, moderate risk, or high risk.

Individuals determined to be at moderate to high nutritional risk are referred to the registered dietitian for nutrition assessment to determine severity and causes of nutritional problems so appropriate intervention/treatment can be planned and implemented.

In summary, screening for nutritional need is used to:
- determine client’s eligibility and priority for program services,
- plan effective nutrition education and counseling,
- decide if the client should see a dietitian/nutritionist,
- determine if the client needs referral to other agencies and programs for special help.
INTRODUCTION AND BASIC SKILLS
Documentation of Nutrition Care
The SOAP Format

OBJECTIVES:
In this lesson, the student will:

1. Identify the rationale for documentation.
2. Comprehend the confidential nature and legal issues of documentation.
3. Practice charting progress notes using the SOAP format.
4. Learn commonly used medical terminology and medical chart abbreviations.

ASSIGNMENTS: Read teacher-developed supplementary materials, Documentation of Nutrition Care, Medical Terminology, and Medical Chart Abbreviations.

MATERIALS: Activity work sheet (1)
Handouts: Documentation of Nutrition Care, Medical Terminology, and Medical Chart Abbreviations.

I. RATIONALE FOR DOCUMENTATION

The client’s medical record or chart is an ongoing collection of information which documents a client’s care. It includes a complete assessment of the client’s health/nutrition status, a care plan, and progress notes monitoring the implementation of the care plan and the client’s response to it.

A. The purposes of the medical record are:
   • document care or services rendered,
   • facilitate communication between members of the health care team,
   • serve as basis for the evaluation of the health care delivery, and
   • comply with laws, regulations and accreditation requirements.
B. **Legal Issues of Documentation:**
The medical record is legal evidence of care given and therefore, must be accurate. Clients have the right to see their medical records. The medical record is also classified as a confidential document.

II. **GUIDELINES FOR DOCUMENTATION**

A. Entries in the progress notes should contain: client name, medical record number, the date, health care team service (or the department), signature and title of the staff writing the notes.

B. If notes are handwritten, write legibly using black or blue ink dark enough to be photocopied.

C. Describe information accurately but briefly and to the point.

D. Be specific—avoid unclear statements. For example, instead of “Client lost weight,” write “Client lost 5 lbs. in two weeks.”

E. Write objective notes, i.e., facts, not conclusions. For example, write, “Client’s weight is below the 5th percentile” instead of, “Client is malnourished.”

F. Use correct medical terminology and medical abbreviations.

G. Use short sentences or phrases. Complete sentences do not have to be used all the time.

H. Do not use personal pronouns. For example, “Client needs counseling on iron-rich foods”, not, “I will counsel my client on iron-rich foods.”

I. Always time and date entries—never back date. Sign every entry with name and title.

III. **THE SOAP FORMAT**

After completing the nutrition screening/assessment of a client, the assessment data, plans for care and needs for further assessment must be documented as progress notes. One format commonly used for writing progress notes is the SOAP format.
S: **Subjective Data**

- client’s thoughts and feelings,
- client’s complaints, history, “quotable” significant information, description of his/her problems, statement of needs,
- information obtained by talking with client or client’s family.

O: **Objective data**

- facts, findings that can be verified, observations,
- physical findings, signs and symptoms,
- anthropometric data,
- laboratory or biochemical data,
- factual information regarding background, history, environment, progress or problems.

A: **Assessment**

- interpretation of client’s nutritional status, needs or problems based on data given under S and O,
- estimate of client’s calorie, protein and other nutrient needs.

P: **Plans**

- plans of action for the problem identified, including:
  - Dx (diagnosis): Plans to obtain more information about.
  - Rx (treatment): Plans for client care/services, problem management.
  - Ed (education): Plans to counsel/educate the client.
  - F/U (follow-up): Schedule of return visits; referrals to other agencies, services and/or R.D.

IV. **MEDICAL TERMINOLOGY**

The nutrition assistant must acquire basic medical vocabulary to function effectively. Although this may seem overwhelming at first, there are some tools to promote easier and faster learning. One such tool is to analyze the component parts of words: root words, prefixes, and suffixes. For example, prenatal has a prefix, *pre-*, meaning “before,” and a root word, *natal*, meaning to do with “birth.” Therefore, “prenatal” means prior to birth. In some cases, the analysis cannot be taken literally but can be used to suggest the meaning.

**NOTE:** Discuss the handouts (Appendix A): *Medical Terminology* and *Medical Chart Abbreviations.*
SAMPLE OF PROGRESS NOTES IN SOAP FORMAT

NUTRITION SERVICE

6-3-02, 1000 hr

Problem I: Excess Body Weight

S: Diet history shows usual intake of 3,000 kcal/day with high intake of sweetened soft drinks. No c/o, 1,500 kcal diet.

O: Ht. 5 ft, 2 in. Wt. 160# (bed scale), IBW 110-120#. Diet Rx-1500 kcals.

A: Prescribed diet is acceptable to client. Needs ed. on wt. reduction diet.

P: Dx: Weigh weekly.

    2. Gave client exchange list booklet with 1500 kcal meal plan to study.
    3. F/U next week.

Rx: Maintain flow sheet of client’s weekly weights to be kept in chart.

Mary Smith, R.D.
ASSIGNMENT I-2 - SOAP PROGRESS NOTES

DIRECTION: Observing all the guidelines, write a SOAP progress note for the given client under Problem #2.

Problem #2: Inadequate Growth.

P.J. is a 24-month old girl seen at the clinic for the first time today. According to her birth record, she was born at 40 weeks gestation, weighing 6 lbs (slightly above the 10th percentile), and her length was at the 10th percentile.

Her mother brought P.J.'s growth record, which showed that both her weight and length progressively dropped percentiles since birth, and the latest measurement at 18 months reads well below the 5th percentile for both weight and length. Today, her weight is 19½ lbs. (Well below the 5th percentile), and her height is also below the 5th percentile.

Her mother noted that P.J. has been a very picky eater but loves Kool-Aid. The mother complained that her baby daughter is sick a lot.
Problem #2: Inadequate Growth

S: Mother noted client is very picky eater; loves Kool-Aid; sick a lot.

O: Birth wt. 6 lbs.—slightly above the 10th percentile; birth length at 10th percentile. Growth record through 18 months shows progressive downward trend in both weight and length. Current wt. of 19½ lbs. well below the 5th percentile for age; length also below 5th percentile.

A: Despite WNL birth wt., client shows growth retardation, has not achieved growth potential. Needs in-depth assessment of possible cause, including a detailed dietary assessment.

P: Dx: Obtain diet history.
Rx: Refer to RD for further assessment.

Jane Hancock, RD
Lesson I-3

INTRODUCTION AND BASIC SKILLS
Interviewing and Counseling Skills

OBJECTIVES:

In this lesson, the student will:

1. List effective ways of establishing rapport with the client.
2. Identify the steps in interviewing and counseling.
3. Demonstrate correct interviewing and counseling skills through role-playing.

ASSIGNMENTS:

          Activity work sheets (2)
          Handouts: Interviewing and Counseling

I. ESTABLISHING RAPPORT

A. DEFINITION

    Rapport is a sympathetic, friendly and trusting working relationship. The establishment of rapport between the nutrition staff and the client is essential to the success of interviewing and counseling.

B. SUGGESTIONS TO ESTABLISH RAPPORT*

    1. Greet the client, being polite, friendly and personal, using name, if possible.
    2. Express interest and desire to help with the problem, e.g. evaluating the diet, regulating weight, etc.
    3. Encourage the client to express fears and concerns about the problem or changes. Be sure to listen thoughtfully, be accepting and non-judgmental. Examples: Is the client afraid to make changes? Worried about cost?
    4. Let the client know that you understand the situation, have helped others with similar problems, and will help the client do what must be done.
5. Express confidence that the client can handle problems and progress toward a solution. Point out expected benefits.


II. INTERVIEWING

Many of the nutrition assistant’s interactions with clients will consist of interviewing or counseling. It is therefore important that techniques for both are learned.

A. DEFINITION

*Interviewing* is a guided communication between a nutrition staff and a client for the purpose of gathering information that can be used to help the client. Interviewing is necessary before counseling is planned and conducted.

B. STEPS IN THE INTERVIEW

1. Starting the Interview

   a. Prepare for the interview by obtaining pertinent background information about the client. Main source is the medical record or medical referral form. Make sure the interview takes place in an environment that is comfortable, private and as free as possible from distractions; allow adequate time.

   b. Use client’s name with appropriate title, except children who can be called by their first names. This serves to identify the client and personalize the interview.

   c. Introduce self by stating name and appropriate title. E.g., Mary Jones, the Nutrition Assistant.

   d. Make initial effort to put client at ease and establish rapport. Suggestions: Inquire about client’s comfort, inquire about client’s purpose in coming, stand as the client enters office.

   e. Explain the purpose of the interview.

   f. Determine client’s knowledge/attitude about the purpose of the interview. A client who is in denial about the condition/problem needs help with this attitude before the interview can proceed successfully.

2. Implementing the Interview

   a. Begin with non-directive (or open-ended) questions. This allows the client to talk about his/her concerns. Later in the interview, use direct and behavioral questions to obtain information
needed. Avoid closed or leading questions. (Refer to Table I-3.1 for different types of questions).

b. Use language that is appropriate for the client; clarify any dialect or slang the client uses.

c. Listen with interest using verbal and non-verbal responses. Examples: non-verbal - leaning forward, frequent eye contact, nodding occasionally; verbal - "yes", "I see", "Uh-huh", "Go on". AVOID: "Very good", "Excellent", or "Fine", to indicate you are listening because these can be taken as acceptance or praise, in turn encourages client to report what you want to hear.

d. Be non-judgmental. Be careful not to judge behaviors as good or bad but simply use the information to plan care and counseling. Avoid evaluative responses such as, "Oh, no!" or frowning. Praise may be given to reinforce a positive activity.

e. Gather information specific to the purpose of the interview by encouraging client to provide only pertinent data. (See Table I-3.2).

f. Allow client to talk without unnecessary interruptions. If the interviewer talks excessively, the client will begin to withdraw.

g. Be sensitive to the client's anxieties, attitudes and emotions.

h. Do not hurry the interview. Keep it on track but be willing to listen and spend time with the client.

i. Check for understanding, e.g. restating and clarifying responses.

j. Summarize the information gathered.

3. Closing the Interview

a. End the interview when the objective or purpose has been achieved or when you notice the client is tiring. Verbal ways to bring the interview to a close: ask if the client has any questions; or say "when I see you again on your next appointment ...".

b. Make a referral if necessary. Inform the client why this is recommended. Assist in scheduling an appointment.

c. Write down for the client time, date and place of next appointment. Indicate what you have planned for next appointment.

d. Summarize items or goals to be accomplished by the client by next appointment, e.g. forms to be completed, a three-day food record, etc.

e. Give the client a phone number where you can be reached for questions.
TABLE I-3.1 Different Types of Questions

<table>
<thead>
<tr>
<th>Type of Question</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Open or neutral questions</strong></td>
<td>require a narrative or explanatory response; allows the client to talk about information that he/she feels is important. Start with what, how or when or an open statement. “Tell me about your favorite foods.” “What is the first thing you have to eat or drink in the morning?”</td>
<td></td>
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<tr>
<td><strong>Closed questions</strong></td>
<td>require only a yes or no answer and provide no additional information. Can be used to ask for specific information but fail to reveal anything else about a client’s attitude. Start with do you or have you. “Do you salt your food at the table?” “Have you tried to lose weight before?”</td>
<td></td>
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<tr>
<td><strong>Leading questions</strong></td>
<td>the interviewer makes suggestions about the desired or expected answer, therefore information gathered may not be accurate. “You don’t drink whole milk, do you?” “What do you eat for breakfast?”</td>
<td></td>
</tr>
<tr>
<td><strong>Behavioral questions</strong></td>
<td>In order to help the client change undesirable eating habits, it is important to find out what he/she eats, not what he/she knows about choosing foods. To accomplish this, behavioral questions are more useful for future counseling efforts than knowledge questions. Behavioral questions use verbs that describe doing rather than knowing something. Examples: Knowledge question: “What do you think about losing weight?” Behavioral question: “What methods have you tried to lose weight?”</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE I-3.2 Strategies for Re-Focusing the Interview

**Controlling Statement**

Asking open or neutral questions may result in storytelling or other deviations from the purpose of the interview. In this case, the interviewer must develop a strategy for re-focusing the interview to the question asked and for the client to provide only pertinent data. Here’s an example:

INTERVIEWER: How often do you eat out?

CLIENT: Oh, my kids and I love this little Mexican restaurant down the street. They serve the best enchiladas. My mother used to fix the kids’ favorite Mexican dishes until she suffered a stroke. Now of course, she ...

In a storytelling response such as this, the interviewer must use a controlling statement to focus the client to the question at hand. For example:

INTERVIEWER: I’m sorry to hear that; but remember we were discussing how often you eat out.

or

INTERVIEWER: You must really like that Mexican restaurant. How often do you eat there?

**Question-framing**

This strategy is needed for clients who are reluctant or uncomfortable to reveal their true habits/behaviors. When the interviewer senses this in a client, it is best to ask a series of “framed” questions. Framed questions allow the client to hypothesize about an imaginary situation and therefore remove himself from a negative disclosure. For example:


INTERVIEWER: Let us for a moment imagine that you were at a friend’s party and the only desserts being served were cheese cake, chocolate mousse, and pecan pie. Which would you choose?

Another example:

CLIENT (a reluctant child): I don’t have favorite foods.

INTERVIEWER: Let us pretend you were invited to spend a day at the beach with some friends. When asked to bring your own food, which foods would you bring?
III. COUNSELING

A. DEFINITION

*Counseling* is the process of providing individualized professional guidance to assist a client in adjusting his/her daily food choices to meet his/her health needs. Data gathered from the interview is the basis for counseling. The purpose of nutrition counseling is to change food practices so that all necessary nutrients are provided, or to modify the food intake for special needs. As much as possible the client and the person who prepares the family meals should both be present for the session(s).

The emphasis in counseling is on the client and actual skills he/she is able to achieve. For this reason, the goals of counseling should be written as behavioral objectives clearly identifying the skills that should be acquired at the end of counseling. A well-written behavioral objective will clarify for the counselor and the client the expected skills or behavior to be achieved. Achievement of a skill/behavior is only possible if the client is asked and given time to practice the skill/behavior during counseling.

Examples of behavioral objectives:

1. The client will plan an adequate diet for pregnancy using the foods and recommended number of servings in the Food Guide Pyramid.
2. The client will select from a list of foods those foods she likes to eat that are allowed on a low-sodium diet.

B. GUIDELINES IN SETTING GOALS & INITIATING DIETARY CHANGE

1. Set reasonable expectations about what changes should be made, the extent of change and timeline.
2. Goals are best set by the client guided by the counselor.
3. Goals should be specific, measurable, reasonable, and attainable.
4. Short-term goals of 1 to 2 weeks are more effective than long-term goals.
5. Build client’s commitment to achievement of goal(s) through a written self-contract. (See Figure I-3.1 for an example).
6. Help promote maintenance of behavior change by using rewards.
FIGURE I-3.1 Self Contract

NAME

PERIOD OF TIME

DESCRIBE SPECIFIC BEHAVIOR GOAL

REWARD UPON ATTAINMENT OF GOAL

CLIENT’S SIGNATURE    DATE

COUNSELOR’S SIGNATURE   DATE

C. STEPS IN COUNSELING

The steps may proceed in a different order or some may be combined.

1. Evaluate the food record gathered from the interview or supplied by the client.
2. Help the client to see how the same basic foods can be used by the whole family. Identify and encourage continuation of good practices.
3. Help the client identify practices needing improvement, e.g., food groups for which intake is low.
4. Help the client to suggest acceptable ways to improve the diet and that can be obtained within available budget.
5. Help the client decide on one or two changes to be made and write the suggestions on the food record.
6. Time should be allowed during counseling session for the client to practice the changes or skills to be achieved from the counseling. For example, if you expect a client to plan a day’s food intake, then allow time to practice this skill during the counseling session or as an assignment to be completed and returned.
7. Give the client the food record with changes to make and suggest it be hung in the kitchen for frequent reference.
8. File a copy of the food record and recommended changes with the medical chart and/or nutritionist’s file.

9. In subsequent visits, follow up on progress. Suggest further changes as needed.

10. Take another food record when changes have been implemented to see whether further counseling is needed. Counseling should continue until the client has made the recommended changes or until it is clear the change will not be made. Client should be praised/congratulated on successful change. The unsuccessful client can be invited to return at a later date when possibilities of success may be greater.

D. EFFECTIVE INTERVIEWING/COUNSELING TECHNIQUES

Some recommended interviewing and counseling verbal skills to gain rapport and cooperation from the client are given in Table I-3.3.

E. FACTORS WHICH CAN INFLUENCE THE COUNSELING SESSION

Various factors in the client, the counselor and the environment can either positively or negatively affect the outcome of the counseling session. For a list of these factors refer to Table I-3.4.
TABLE I-3.3  Effective Interviewing/Counseling Techniques

1. **Exploratory response** – acknowledges that the counselor is listening, usually used after a pause in the client’s narration.

   **Example:** “I see,” “Go on,” “I’d like to hear more about that.”

2. **Probing response** – used in an attempt to gain additional information.

   **Example:** “So you think the diet doesn’t work. Could you tell me a little more about that?”

3. **Paraphrasing** – ensures that the information is clear and correct by repeating, summarizing or rewording what the client said. It also demonstrates that the counselor is listening and trying to understand.

   **Example:**
   Client: “There seems to be no reason for me not to have lost a few pounds.”
   Counselor: “You don’t see any reason why you did not lose any weight.”

4. **Empathetic response** – involves relating back to the client the feelings the counselor perceives in the client’s response; particularly effective when client’s response has significant emotion attached to it.

   **Example:**
   Client: “There are so many things to learn. I just don’t know if I can possibly stay on this diet plan.”
   Counselor: “You seem to be pretty discouraged about your diet.”

5. **Confrontation** – useful if used carefully to deal with client resistance. The counselor shares with the client how the counselor sees the client’s problem.

   **Example:**
   Client: “I’m not interested in staying healthy.”
   Counselor: “I heard you say earlier you cared about being well. I think there is some conflict in what you’re telling me.”
### TABLE I-3.4 Factors Which Can Influence Counseling Session

<table>
<thead>
<tr>
<th>POSITIVE FACTORS</th>
<th>NEGATIVE FACTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CLIENT</strong></td>
<td></td>
</tr>
<tr>
<td>- has made the choice to see the counselor and has arranged the appointment</td>
<td>- emotional stress (recent operation; stress of diagnosis)</td>
</tr>
<tr>
<td>- awake, alert</td>
<td>- physical or mental handicap</td>
</tr>
<tr>
<td>- free from pain (emotional and physical)</td>
<td>- quiet, resistant to share feelings</td>
</tr>
<tr>
<td></td>
<td>- has been told to see the counselor</td>
</tr>
<tr>
<td><strong>COUNSELOR</strong></td>
<td></td>
</tr>
<tr>
<td>- is relaxed; self-confident</td>
<td>- disorganized; unprepared</td>
</tr>
<tr>
<td>- speaks in a patient, pleasant tone</td>
<td>- accusatory</td>
</tr>
<tr>
<td>- is well prepared and organized</td>
<td>- judgmental</td>
</tr>
<tr>
<td>- maintains good eye contact</td>
<td>- closed minded</td>
</tr>
<tr>
<td>- encourages client to speak openly and honestly</td>
<td>- has not allotted appropriate time for interview, appears rushed</td>
</tr>
<tr>
<td>- listens attentively</td>
<td>- does not guide interview</td>
</tr>
<tr>
<td>- instills confidence in the client</td>
<td>- asks too many closed ended questions</td>
</tr>
<tr>
<td>- uses appropriate body language</td>
<td>- does not speak on the client’s level: either talks down or speaks in terms or jargon which are too complex</td>
</tr>
<tr>
<td>- minimizes note taking</td>
<td></td>
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<tr>
<td>- maintains control of the counseling session</td>
<td></td>
</tr>
<tr>
<td>- observes client’s attitudes and expressions and uses them to guide the session</td>
<td></td>
</tr>
<tr>
<td>- provides clear, concise answers to questions</td>
<td></td>
</tr>
<tr>
<td>- elicits client’s goals and concerns</td>
<td></td>
</tr>
<tr>
<td>- uses teaching tools effectively</td>
<td></td>
</tr>
<tr>
<td>- is accepting and non-judgmental</td>
<td></td>
</tr>
<tr>
<td><strong>ENVIRONMENT</strong></td>
<td></td>
</tr>
<tr>
<td>- quiet, private setting</td>
<td>- noisy area</td>
</tr>
<tr>
<td>- presence of supportive family members</td>
<td>- distractions from other patient/staff</td>
</tr>
<tr>
<td>- orderly, uncluttered desk</td>
<td>- presence of non-supportive or controlling family members</td>
</tr>
<tr>
<td>- availability and appropriate use of teaching aids</td>
<td>- large imposing desk arrangement</td>
</tr>
</tbody>
</table>

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1 Some of these factors may be related only to the in-patient or the out-patient setting.
ACTIVITY I-3 – INTERVIEW QUESTIONS

A. Indicate if each question given is open or closed. If a question is closed, rewrite it as an open question.

1. Do you eat anything between meals?
2. How often do you eat eggs?
3. Have you started feeding cereal to your baby?
4. Do you drink a fruit juice for breakfast?

B. In the next set of questions, indicate whether the question focuses on knowledge or on behavior. If a question focuses on knowledge, rewrite it as a behavioral question.

1. What kinds of breakfast cereals do you eat?
2. Do you know what foods are rich sources of iron?
3. What do you think about losing weight?
4. What do you do for your morning sickness?
ANSWERS TO ACTIVITY I-3

A. 1. Closed.
   “What, if anything, do you eat between meals?”

   2. Open.

   3. Closed.
   “In addition to milk, what other foods do you feed your baby, if any?”

   4. Closed.
   “If you have anything to drink in the morning, what would it be?”


   2. Knowledge.
   “How often do you eat liver, dried beans and peas, or dark green leafy
   vegetables like spinach, mustard greens, etc.?”

   “What have you done about losing weight?”

ASSIGNMENT I - 3 – ROLE PLAYING OF TECHNIQUES

Group activity (40 points):

In groups of 3, plan and role-play one of the following scenarios, observing all guidelines and using as many of the verbal and non-verbal skills for interviewing and counseling. One will play the role of the counselor, another the client, another the husband or parent, and the last will be the narrator/observer. Allow 5-7 minutes for the interaction.

1. A pregnant client is being interviewed about her food intake and the use of alcohol. You have some evidence that the client regularly drinks alcoholic beverages, but she says she drinks only fruit juices and milk.

2. A diabetic child is being interviewed about after-school snacks. He says he eats only fruits and vegetables, but you have reason to believe otherwise.

3. A seven-year old girl who has iron-deficiency anemia is being interviewed along with her mother on her usual intake of iron-rich foods.

4. A 28 year old overweight pregnant client in her first trimester is being counseled on healthier food choices to control the amount of weight gained.

5. An underweight pregnant teenager in high school is being counseled on food choices for pregnancy and weight gain.

6. A pregnant 35 year old client in her second trimester who is below recommended rate of weight gain is being interviewed on her usual food intake.

7. A 70 year old widower is being interviewed because of a weight loss of 7 lbs. in two months. He lives by himself after the death of his wife a few months ago. His wife has done most of the food shopping and preparation.
Lesson II-1

NUTRITION & ASSESSMENT IN PREGNANCY & LACTATION

Nutritional Needs and Nutrition-Related Problems

OBJECTIVES:

In this lesson, the student will:

1. Describe nutritional needs during pregnancy and the rationale for these needs.
2. Recommend a daily food guide in pregnancy in terms of food groups and recommended number of servings.
3. Discuss guidelines on recommended nutrient supplements in pregnancy.
4. Explain suggested strategies to alleviate common nutrition-related discomforts in pregnancy.
5. Discuss food assistance programs for pregnant women, infants and children.

ASSIGNMENTS:

MATERIALS: Videotape: Eating for Two, Cambridge Educational, 1992
Constipation, Heartburn, California Department of Health Services.
Guidelines for Teaching to Correct Nutrient Deficiencies.
Prenatal Nutrition Counseling Guidelines.
Activity Work sheet and Take-home assignment. (1).

The importance of good nutrition in pregnancy is well recognized. All the changes in the woman’s body and the growth and development of the fetus all require nutrients from maternal stores and diet. For most women, nutrient needs during pregnancy and lactation are at their highest than at any other time.
I. ENERGY AND NUTRIENT NEEDS

The nutrients that have a role in pregnancy and the reason(s) for the increased need will be discussed.

A. Energy

Energy requirements during pregnancy depend on two factors: (1) increase in basal metabolism needed to support the growth of the fetus and maternal tissues and (2) changes in the mother’s usual physical activity. On the average, 300 kcalories above the allowance for non-pregnant women is needed but only during the second and third trimesters. This means that pregnant women will need about 2500 total kcalories daily. Pregnant women who are underweight or exceptionally active and pregnant teenagers may require more.

Since nutrient needs increase more than energy needs, the additional 300 kcalories should come from nutrient-dense foods such as nonfat milk, lean meats, fish, poultry, eggs, dried beans and legumes, dark green vegetables, citrus fruits, and whole-grain breads and cereals. The rate of weight gain is a good indicator whether the pregnant woman is meeting her energy needs.

B. Protein

Recommended protein intake during pregnancy is increased by 25 grams a day above the non-pregnancy intake. This extra protein is needed to support maternal and fetal growth, which progressively increases from the second month to term.

Meeting protein needs does not seem to be a problem for pregnant women in the United States, including those with low incomes and vegetarians who eat adequate servings of sources of plant protein. The use of high protein supplements during pregnancy can be harmful. These supplements have been associated with increased premature births and neonatal deaths.

C. B vitamins Associated with Energy Needs

Thiamin, riboflavin and niacin needs are increased to process the increased amounts of carbohydrate, protein and fat to meet increased energy requirements.

D. Vitamin B 6

The need for vitamin B6 or pyridoxine increases because of the increased protein synthesis occurring during pregnancy.
E. Folate

The RDA for folate increases during pregnancy, i.e. 400 mcg. (0.40 mg) per day for non-pregnant women, and 600 mcg. (0.60 mg) per day during pregnancy. Folate is required for cell division which occurs as new cells in the fetus undergo rapid growth and as maternal red blood cell mass expands. If folate needs are not met, *megaloblastic* anemia develops caused by the production of immature red blood cells. The anemia responds to appropriate dietary and folate supplementation.

There is also indication that folate plays an important role in preventing neural tube defects resulting in fetus with *spina bifida* (disorder characterized by incomplete closure of the spinal cord and its bony encasement). Currently, the National Academy of Science considers it wise to supplement maternal diet with low amounts of folate if inadequacy is suspected.

F. Vitamin B12

The need for vitamin B12 or cobalamine is slightly increased. Like folate, vitamin B12 is important for cell division and a deficiency can lead to megaloblastic anemia. Fortunately, deficiency is rare since inclusion of modest amounts of meat, fish, eggs or milk produces together with body stores meet the need for the vitamin. At risk are strict vegetarians. These women need vitamin B12 supplements of 2 mcg per day.

G. Vitamin D

Vitamin D is needed for normal development of bones and teeth in the fetus and maintenance of maternal bones and teeth because of its role in calcium absorption and utilization. Use of vitamin-D fortified milk and exposure to sunlight is usually adequate to meet needs during pregnancy. Strict vegetarians can insure adequate vitamin-D by exposure to sunlight or from fortified soy milk. Diets should not be routinely supplemented because of the risk of toxicity.

H. Calcium

The Recommended Adequate Intake (AI) are 1300 mg (14 to 18 yr.) and 1000 mg (19 to 50 yr.), same amount as for non-pregnant women due to increased efficiency of calcium absorption. This amount is needed to support the rapid skeletal growth of the fetus in the last trimester. Providing the additional calcium early in pregnancy makes it possible for
calcium to be stored in the mother’s bones and withdrawn later in gestation to meet fetal needs.

Pregnant women at risk are those under 18 because their own bodies are still actively growing. Any of these women who receive less than 600 mg. of calcium from the diet will need to increase their intake of milk, other dairy products and other calcium-rich food or take daily supplement of 600 mg. of calcium.

I. **Iron**

Since most women do not have adequate iron stores and because the increased need for iron is not easily met by diet alone, it is recommended that all pregnant women need a daily iron supplement of 30 mg. of ferrous iron during the second and third trimesters.

The increased iron requirement is necessary to support the increased maternal blood volume and to provide for the placenta and fetus in the production of hemoglobin. Fetal production of red blood cells takes priority so that, if the increased need is not met, the fetus draws upon maternal iron stores to develop stores of its own during the last trimester.

To enhance absorption of iron, iron-rich foods should be eaten with vitamin-C rich foods. Likewise, iron supplements are best absorbed if taken between meals or at bedtime or on an empty stomach and with liquids other than milk, coffee or tea.

II. **DAILY FOOD GUIDE FOR PREGNANCY**

The calorie and nutrient needs during pregnancy are high. With the exception of iron, a balanced diet using a variety of foods that includes an extra serving of each of the five food groups can usually meet this need. (Refer to the textbook for food groups and recommended number of servings for pregnancy).

III. **NUTRIENT SUPPLEMENTATION RECOMMENDATIONS**

The best way to meet the nutrient needs in pregnancy is through a variety of foods. As mentioned earlier, iron supplementation is recommended for all pregnant women. Other nutrients will also need to be supplemented for pregnant women at nutritional risk. Daily multi-vitamin-mineral supplements are recommended for women with inadequate diets and for those in high-risk groups including women carrying multiple fetuses, heavy smokers, alcohol/drug abusers, etc. Appendix B/Handout outlines the nutrient supplementation as recommended by the National Academy of Sciences, 1990.
IV. COMMON NUTRITION-RELATED DISCOMFORTS

Most common discomforts in pregnancy are related to gastrointestinal difficulties brought on by hormonal, maternal and fetal growth changes. Most will respond to preventive measures, changes in dietary practices and reassurances. However, if these discomforts persist or become severe, the woman must be referred for further medical care. The more common discomforts include nausea and vomiting, constipation, hemorrhoids, and heartburn.

A. Nausea and Vomiting

The so-called morning sickness is usually mild and occurs in the early months of pregnancy, although it may be more severe and last longer in some. This discomfort is caused by the hormonal changes that occur early in pregnancy and to a certain degree by psychological factors such as the anxiety and stress concerning the pregnancy.

Simple, traditional measures usually improve tolerance for food. (Refer to the textbook for suggested guidelines for nausea and vomiting). Medical referral is needed if the condition persists or develops to severe and persistent vomiting for long periods of time.

B. Constipation

Constipation is caused by hormonal changes that relax the gastrointestinal muscles slowing the passage of food through the intestinal tract. In addition, the growing fetus crowds the lower portion of the intestines.

Guidelines to prevent or relieve constipation are given in the textbook. The pregnant woman should be cautioned against the use of laxatives. Laxatives should only be used under medical supervision. Use of mineral oil should also be avoided because it prevents the absorption of fat-soluble vitamins.

C. Hemorrhoids

A common problem that develops later in pregnancy is hemorrhoids. The swollen veins in the anus are due to the increased weight of the fetus and the downward pressure it creates.

The problem is often remedied by following the guidelines to prevent constipation since straining during bowel movement makes it worse.
D. **Heartburn**

Heartburn commonly occurs in the third trimester of pregnancy. This discomfort usually occurs after meals, caused by the pressure of the growing fetus on the woman’s stomach. Food mixtures may back up and create a burning sensation in the lower part of the esophagus near the heart.

Guidelines to prevent or relieve heartburn are given in the textbook. Note: Discuss Appendix G-2/Handout, *Prenatal Nutrition Counseling Guidelines.*

V. **FOOD ASSISTANCE PROGRAM**

**WIC Program**

In 1972, the WIC Program (Special Supplemental Food Program for Women, Infants and Children) was established. The program is funded by the Food and Nutrition Service of the U.S. Department of Agriculture and administered by state health departments. Its goal is the improvement of diets of pregnant and lactating mothers, infants and children up to 5 years of age who are nutritionally at risk and are low-income. It accomplishes this goal by providing:

- food vouchers that are used to purchase foods from each of the major food groups: milk, protein foods, fruit/vegetables, and cereals,
- food and nutrition education to participating mothers, and
- appropriate health care given directly or by referral.

Possible topics covered in WIC nutrition education classes include: food buying, food preparation, infant/child feeding, and concerns of homeless mothers.

Many follow-up studies have shown that prenatal WIC participation can effectively reduce low birth weight and newborn medical costs.
ACTIVITY II – 1 - PRENATAL CASE STUDY

Lucia V. is a 19 year-old married primigravida on her sixth week of pregnancy. She has no history of chronic and other serious health problems.

During her first diet interview, Lucia indicated that the pregnancy was unplanned. She seemed especially worried about not being able to buy the foods she needed while pregnant. As college students, she and her husband live on limited income; she was also concerned about their eating on the run and mostly eating fast foods.

Lucia’s 24-hour diet recall showed inadequate intake of dark green or yellow vegetables, milk products, and citrus fruits. The couple realizes these foods are part of a healthy diet but are inexperienced as cooks and feel they lack the time and money to prepare healthful meals every day.

A. QUESTION FOR GROUP DISCUSSION:

1. What nutrients would you expect to be inadequate in Lucia’s diet?

2. What practical problems would you expect her to encounter in trying to improve her diet?

3. In outline form, write a counseling plan for Lucia based on what you know about her. Include how you plan to teach the material(s).
   NOTE: One group will do a role-playing demonstration on counseling Lucia.
B. **TAKE HOME ASSIGNMENT (25 POINTS)**

Write a 1-day meal plan for Lucia, using the amounts recommended in the textbook. Be sure to consider her lifestyle and income so that the plan will be acceptable.

<table>
<thead>
<tr>
<th>Meal</th>
<th>Menu (food &amp; drink)</th>
<th>Amount</th>
<th>Fruits and Vegetables</th>
<th>Breads</th>
<th>Cereals</th>
<th>Grains</th>
<th>Milk</th>
<th>Protein</th>
</tr>
</thead>
</table>

Total:

Evaluation:
Lesson II-2

NUTRITION & ASSESSMENT IN PREGNANCY & LACTATION
Factors that Affect the Outcome of Pregnancy

OBJECTIVE:

In this lesson, the student will:

1. Describe additional factors that affect the course and outcome of pregnancy.
2. Discuss the effects of substances and practices that can be harmful to the fetus.
3. Identify health problems that can adversely affect the mother and/or the fetus.

ASSIGNMENTS: 1. Be ready to role-play a counseling session on a harmful practice during pregnancy.

MATERIALS: Handout: *You Have a Choice, but Your Baby Doesn't*, WIC Supplemental Food Branch.

In addition to nutrition, there are many other factors that can affect the outcome of pregnancy. Of these, the lifestyle factors can be modified to increase the chances of a healthy pregnancy. Woman planning to have children need to be informed about these factors to know which practices to avoid.
I. OTHER FACTORS THAT AFFECT THE OUTCOME OF PREGNANCY

A. Material Age

The risks of infant mortality and low birth weight are high in adolescent pregnancies, especially those younger than 15 years of age. Those who become pregnant less than four years after menarche (onset of menstrual cycle) are at high nutritional risk since they have to meet their own energy and nutrient needs for growth as well as that of pregnancy. The decreased amounts of available nutrients results in fetal growth retardation and low birth weight infants.

There are also risks in pregnancies in older women. Women over 35 years of age have decreased ability to adapt to the physiological changes of pregnancy resulting in greater problems in carrying the fetus to term. There are also increased risks of developing diabetes and high blood pressure in pregnancy.

B. Closely Spaced Pregnancies

Repeated pregnancies less than eighteen months apart deplete the mother’s nutrient reserves. The recommended interval between pregnancies to readjust to the non-pregnant state and rebuild nutrient reserves is 18 months. Less time increases the risk of anemia, fetal deaths in the last trimester, and in the neonatal period.

C. Parity

The number of pregnancies a woman has had referred to as parity can affect the outcome of pregnancy. First pregnancies are more difficult and have greater problems of complications during labor and delivery. On the other hand, there is greater risk of infant mortality in infants born of sixth or later pregnancies.

D. History of Past Pregnancy

Women with past history of complications in pregnancy or a history of fetal or infant death have a greater risk of poor pregnancy outcome and need to be closely monitored. A history of neural tube defects, such as spina bifida, and fetal alcohol syndrome also indicate the need for close follow-up and intervention to prevent recurrence in future pregnancies.
E. Socioeconomic Status

There is a strong relationship between low socioeconomic status and low birth weight. Impaired fetal development is more common and most likely due to one or more of the following:

- inadequate diets to support a healthy pregnancy,
- limited access to prenatal and medical care,
- lack of education concerning nutrient needs,
- poor living conditions, and
- more common occurrence of teen pregnancies, smoking, alcohol and drug abuse.

F. Stress

Constant stress makes the pregnant woman more susceptible to health problems which can affect the fetus. There is evidence that excessive maternal stress can cause pre-term labor and delivery and low birth weight.

II. HARMFUL SUBSTANCES AND PRACTICES

A. Alcohol

In 1973, a unique set of characteristics were identified in infants born of women who were heavy drinkers. The condition is referred to as *fetal alcohol syndrome* (FAS). FAS is associated with high rate of prenatal mortality and those infants who survive have permanently impaired physical and mental development. The physical characteristics of infant/child with FAS include:

- abnormalities in the eyes: small eye openings with downward slant,
- abnormalities in the nose: short, upturned nose, low nasal bridge,
- abnormalities in the mouth: thin upper lip, cleft lip with/without cleft palate, underdeveloped jaw,
- minor malformation of the ears,
- small head circumference, and
- flattened mid-face.

In the past decade, research has shown that even moderate intake of alcohol may produce infants showing milder forms of FAS, referred to as *fetal alcohol effects*.

The mechanism how alcohol produces such harmful effects on the fetus is not completely understood. It is suspected that since alcohol crosses the placenta, the high alcohol level build up in the fetus causes
direct toxic effects. Another theory is that maternal malnutrition due to heavy drinking could play a role in FAS.

It is recommended to include counseling sessions and/or therapy to heavy drinkers very early in prenatal care.

**KEY POINTS IN COUNSELING:**

- There is no established safe level of alcohol intake during pregnancy (even the alcohol content of non-prescription cough syrup has been shown to cause FAS),
- alcohol abuse is a major preventable cause of low birth weight among infants,
- alcohol intake is the major preventable cause of mental retardation.

B. **Illicit Drugs**

Drugs such as cocaine pass easily through the placenta and impair development of the fetus. Drug abuse results in pre-term births, low birth weights and sudden infant deaths. Those who survive suffer withdrawal symptoms, may be hypersensitive or under-stimulated, and their mental development later in life is impaired.

C. **Medicinal Drugs**

Pregnant women should not take any medication without first consulting with their physician. There are now warnings on labels of certain medications regarding this. Some drugs can cause problems during labor and serious birth defects. For example, even aspirin (or ibuprofen) should not be used during the last trimester, unless directed by a doctor, because it causes problems in the fetus or excessive bleeding during delivery.

D. **Smoking**

Smoking during pregnancy results in fetal growth retardation. The birth weight usually decreases as the number of cigarette smoked per day increases. The growth retardation is explained by the effects of carbon monoxide, nicotine and other substances on the transport of oxygen to the fetus. It is also possible that the utilization of kilocalories is reduced in women who smoke. Therefore, it is important to counsel women who smoke to stop – at least during pregnancy.
E. Caffeine

Although there is no evidence of permanent damage to the fetus, caffeine can be potentially harmful. An association has been shown between moderate to heavy users of caffeine (in coffee, tea, cola, cocoa, etc.) and higher incidence of spontaneous abortion. There are also documented cases of fetal heart rate irregularities (fetal arrhythmias) caused by excessive intake of caffeine. In view of these, pregnant women should be advised to use caffeine in moderate amounts, i.e. one to two cups per day, if at all.

F. Pica

Pica is the craving and compulsive eating during pregnancy of nonfood substances such as dirt or clay, starch, ice, charcoal, mothballs, coffee grounds, air freshener blocks, etc.

The harmful effects of this practice include the following:

- could result in reduced food intake leading to inadequate intake of essential nutrients,
- substances eaten may contain toxic compounds, e.g. lead from wall plaster,
- some substances can interfere with absorption of certain minerals, such as iron,
- fecal impaction from eating of clay,
- gastrointestinal obstruction from eating excessive amounts of laundry starch, and
- parasitic infection from eating of contaminated soil or clay.

G. Large Doses Of Vitamin and Mineral Supplements

More is not better when it concerns vitamin-mineral supplements. Many vitamins are toxic when taken in excessive amounts while some minerals are toxic at amounts not much above recommended levels. Eating a variety of foods can supply most of the vitamins and minerals needed by the pregnant woman and supplements should only be taken upon the advice of a registered dietitian or physician.

H. Dieting for Weight Loss

This is a dangerous practice, even for short periods, during pregnancy. For example, low carbohydrate diets or fasts can deprive the fetal brain of glucose and impair its development. These diets are lacking in nutrients needed for fetal growth. Therefore, a pregnant woman regardless of pre-pregnancy weight should never try to lose weight.
III. HEALTH PROBLEMS

There are some potentially serious conditions during pregnancy that can affect the mother and/or the fetus. All these conditions need to be monitored by the physician and dietitian to increase the chance of a healthy pregnancy.

A. Anemia

The two common types of anemia in pregnancy are related to poor nutrition.

1. Iron deficiency anemia – most common type. Anemia occurs in late stages of iron deficiency which develops when maternal iron stores cannot meet the demands of increased erythropoiesis (formation of red blood cells) that occur in pregnancy. Decreased hematocrit levels have been associated with increased incidence of premature birth.

A recommended blood test indicative of iron stores is serum ferritin. Hemoglobin and hematocrit value can be normal, even when iron stores are low, until iron deficiency is severe making them poor indicators of iron stores.

Supplementation of 30 milligrams of iron per day as ferrous salt is recommended during the second and third trimesters. For women receiving more than 30 mg. of iron per day, 2 mg. copper and 15 mg. zinc per day are also recommended.

The pregnant woman should be counseled and encouraged to include a rich source of iron and vitamin C at each meal.

2. Megaloblastic anemia – usually caused by folacin deficiency. It is less common than iron deficiency anemia.

B. Diabetes

1. Diabetes diagnosed before pregnancy – the best pregnancy outcome in diabetic women are those with blood sugars under control before becoming pregnant. Insulin dependent diabetic mothers have increased risk of delivering babies with congenital malformations.

2. Gestational diabetes – this is increased blood glucose levels that develop during pregnancy. Infants of mothers with gestational diabetes are at increased risk for intrauterine death,
neonatal mortality, *macrosomia* (large body size), *hyperbilirubinemia* (increased bilirubin in the blood).

Pregnant women with diabetes should receive individual nutrition assessment, counseling and follow-up by a registered dietitian.

C. Hypertension

Hypertension increases the risk of pre-term labor and intrauterine death.

1. Chronic hypertension – increased blood pressure of 140/90 mm. Hg or higher observed before pregnancy or before the 20th week of gestation.

2. Pre-eclampsia – symptoms include:
   - systolic pressure of 30 Mm. Hg. or more above normal or
   - diastolic pressure of 15 Mm. Hg or more above normal, and
   - *proteinuria* (protein in the urine) and/or edema.

   Occurrence of seizures or convulsions along with the above symptoms is *eclampsia*.

NOTE: Sodium is **not** restricted to less than 2 grams per day since it is essential to maintain normal levels of sodium in the blood, muscles, bones and brain.
Lesson II-3

NUTRITION & ASSESSMENT IN PREGNANCY & LACTATION
Factors that Contribute to Successful Lactation

OBJECTIVE:

In this lesson, the student will:

1. Describe physiologic adaptations in the mother’s body to support lactation.
2. Describe the benefits of breast feeding to the infant and to the mother.
3. Identify nutrient needs of the mother to support lactation and how to determine if the mother’s diet provides these needs.
4. Discuss factors that affect the quality and quantity of breast milk.
5. Give suggestions to resolve problems commonly encountered in breast feeding.
6. Identify resources available to help breast feeding mothers.

ASSIGNMENTS:

Nutrition Counseling Guidelines During Lactation.
Take-home assignment (1)

I. PHYSIOLOGICAL ADAPTATIONS

Breast feeding is successfully started in at least 99% of women who try. Most of the changes to the breast occur during pregnancy, not during lactation. Therefore, women who believe that breast feeding will spoil the shape of the breasts can be reassured otherwise.

The physiologic changes that occur to establish and maintain lactation include:

- changes in size and appearance of the breasts.
  In the first trimester, estrogen stimulates the breast to grow and small ducts to form. Starting with the second trimester, the ductules group
together to form milk-producing lobules, referred to as *alveolus*. As these tissues increase the breasts become heavier and fuller. During the last month of pregnancy, the nipples and areola (pigmented area surrounding the nipples) become darker and the little bumps (Montgomery’s glands) become more noticeable.

- **initiation and maintenance of milk secretion.**
  
  Full lactation does not begin immediately after birth. During the first 2 or 3 days postpartum, a small amount of *colostrum* is secreted (thin, yellowish liquid secreted shortly before and after birth; very rich in antibodies). After this period milk secretion rapidly increases and may take 2 or 3 weeks for full lactation to occur. Milk secretion is stimulated by sucking which triggers the release of the pituitary hormone, *prolactin*. If sucking is discontinued, release of prolactin stops and milk secretion also stops.

- **ejection of milk from the alveoli to the nipples.**
  
  Sucking on the nipple triggers the release of the pituitary hormone, *oxytocin* which stimulates the contraction of the muscle-like cells around the alveoli causing milk to be ejected to the nipples. This mechanism is referred to as milk ejection reflex or *let-down reflex*. This reflex is very sensitive small changes in oxytocin level which in turn is affected by emotional and psychological factors, such as stress, sorrow, anxiety, fear, fatigue, embarrassments or pain.

Mohrbacher and Stock, 1991 suggested that the let-down reflex can be stimulated by:

- relaxation exercises,
- applying a warm washcloth on the breast before nursing or taking a warm shower,
- breast massage,
- nursing in a calm, undistracted environment, and
- nursing while lying down.

II. **BENEFITS OF BREAST FEEDING** *

A. **Benefits for the Mother**

- allows for quicker recovery from childbirth by helping the uterus (through contractions stimulated by infant’s sucking) return to normal size sooner,
- delays onset of ovulation and consequent delay of menses. However, this does not necessarily prevent pregnancy, so other forms of contraception should be used,
- may be protective against breast cancer,
- less expensive, more convenient, and requires no time for preparation.
- eliminates concern over the quality and safety of the water added to formula.
• facilitates weight loss after childbirth since milk production requires energy, and
• stimulates the released of the hormone prolactin that brings a sense of relaxation and well-being.

B. Benefits for the Infant

• provides antibodies and other antimicrobial agents. This is significant since the infant’s immune system does not mature for several months after birth,
• provides the right balance of nutrients which changes over time to meet the infant’s changing nutritional needs. Nutrients are in easily absorbable form.
• sanitary and at the proper temperature at all times,
• encourages bonding by providing skin-to-skin contact between mother and infant. This makes infant feel secure and loved.
• appears to reduce risk of developing gastrointestinal diseases, and long-term protective effect against other diseases,
• may protect infant against food allergies, and
• always available when the mother and infant are together.


III. NUTRIENT NEEDS OF THE MOTHER

A. Calories

For a lactating mother to produce approximately 25 ounces of milk daily, and additional 650 kcalories above her regular daily need is required. It is recommended that 500 calories is derived from nutrient-dense foods and the rest of the calories is provided by the mother’s fat stores. Severe calorie restriction will decrease milk production.

B. Protein

Protein need is increased slightly above the amount recommend for pregnancy, i.e. from 60 grams to 65 grams during the first six months of lactation, and 62 grams for the second six months.

C. Vitamins and Minerals

Vitamins A and C are increased in the RDA for lactation to insure production of milk that is adequate in these two vitamins. The
recommended amounts for thiamin, riboflavin and niacin are increased
to help in the utilization of increased calories needed during lactation.
However, vitamin B6 and folate are slightly decreased compared to the
RDA for pregnancy. Adequate iron is necessary to build stores that
may have been reduced during pregnancy and delivery. Like in
pregnancy a 30 milligram iron supplement is recommended daily.

D. Water

A lactating mother needs plenty of fluids to prevent dehydration. A
simple guideline is to drink a glass of milk, juice or water at each meal
and each time the baby nurses to a total of 8 to 10 cups per day.

E. Daily Food Selection

No special foods are needed to support lactation. Adequate amounts
of simple foods from the Daily Food Guide are recommended. Any
mother with restrictive eating pattern is at nutritional risk and should be
referred to the registered dietitian/nutritionist for further counseling.

IV. FACTORS THAT AFFECT BREAST MILK

A. Maternal Nutrition

Although there are differences from one nutrient to the next, in general,
nutritional deficiencies reduce the quantity, not the quality of breast
milk. Breast milk will be adequate in protein, carbohydrate, fat and
most minerals even if the mother’s supplies are limited. The quality of
the milk in these nutrients as well as folate is maintained at the
expense of maternal stores. However, if the mother’s diet is
inadequate for prolonged periods in vitamins B6, B2, A and D, the
breast milk will also be low in these nutrients. Minerals affected by the
maternal diet are iodine and selenium.

B. Specific Foods

Although a lactating mother can eat any nutritious food, some foods
with strong or spicy flavors, such as garlic, may affect the flavor or
breast milk. If the mother suspects that certain foods cause the infant
discomfort, she will have to eliminate the food from her diet and see if
the infant’s discomfort is relieved. Generalizations regarding which
foods cause discomfort are not useful since reactions from infants are
very individualized.
C. **Rest and Relaxation**

A busy, stressful schedule and lack of rest can decrease milk production. Therefore, mothers should get adequate rest to insure successful lactation.

D. **Alcohol**

Lactating mothers are advised to limit their intake of alcoholic beverages, if at all. Alcohol ingested by the mother enters the breast milk and reaches the same concentration as that in the mother’s blood.

Alcohol in breast milk can affect lactation and/or the infant in different ways: (1) change the flavor of breast milk, (2) reduce milk production, (3) suppress the infant’s feeding behavior, and (4) regular alcohol consumption is associated with delayed psychomotor development in the infant.

E. **Caffeine**

Caffeine passes from the mother’s bloodstream into breast milk. An intake of six to eight cups of any caffeine-containing beverages can result in the infant being wakeful, irritable and hyperactive. Large amounts of caffeine may also interfere with the availability of iron from the milk. Lactating mothers should be advised to limit their intake of caffeine-containing beverages, such as coffee, cola drinks, tea and chocolate to one to two cups a day. (See handout/Appendix G-3 for counseling pointers.)

F. **Drugs**

Many drugs can adversely affect breast feeding, either because they suppress lactation or because they pass into the breast milk. Therefore, a lactating mother should consult her physician before taking any medication.

Illicit drugs are harmful to both mother and infant. Illicit drugs pass into breast milk and can deliver high doses of the drug to the infant and cause irritability, tremors and hallucinations.
V. COMMON PROBLEMS ENCOUNTERED IN BREAST FEEDING

A. Sore Nipples

Generally, the mother should not feel tenderness and pain during nursing, except relatively mild soreness in the immediate postpartum period while adjusting to breast feeding. Soreness that persists beyond 2 weeks postpartum or soreness accompanied by redness and tenderness of the areola must be treated promptly before tissue cracking occurs.

The following suggestions may be help:

- check that the infant is positioned properly for nursing and the infant’s mouth grasps a good portion of the areola,
- feed the infant on demand. Infrequent feeding causes the hungry infant to suck too hard on the breast; also, the breasts get engorged and the infant may not be able to grasp the nipple and areola properly in the mouth,
- vary the position with each feeding to allow the infant to such on different areas of the areola,
- start each feeding with the breast that is least tender,
- promptly remove the infant from the breast when feeding is completed. Seven to 10 minutes on each breast should be sufficient if nipples are tender,
- let nipples dry well after feeding. Allow air to circulate on them as freely as possible, and
- avoid using soaps, alcohol, and petroleum-based products on the nipple area as they cause dryness and further irritation. Nipples should be washed using plain, clear water.

B. Engorged Breasts

Engorgement refers to the swelling of the breasts and occurs any time if milk is not emptied from the breasts frequently. The breasts will feel full, hard, tender and/or painful. The infant will find it difficult to attach to the breast since the nipple and areola become taut and hard.

Recommendations to relieve engorged breasts include:

- take a hot bath/shower or apply moist heat to the breasts for 10 minutes to stimulate the let-down reflex.
- express some milk to soften the breast and make nursing easier for the infant,
- massage the breasts to stimulate milk to flow, and
- apply cold compress to the breasts after feeding to reduce the swelling and pain.
C. **Plugged Milk Ducts**

A milk duct can become clogged with or other cast off cells. Symptoms include localized tender area on the breast or a lump in the breast but without fever or flu-like symptoms. Causes include severe engorgement, consistently nursing on one breast only, infrequent nursing, or pressure on the breast.

The following help unclog a plugged milk duct:

- take a hot shower or apply warm, moist heat to the area,
- massage breast from the affected area down to the nipple before and during nursing,
- nurse every 1½ to 3 hours using different positions,
- position infant’s chin toward the plugged duct and empty the affected breast first, and
- get a lot of rest.

D. **Mastitis**

*Mastitis* is an inflammation of the breast caused by an infection of the breast. Symptoms include redness and tenderness in the breast area, fever and flu-like symptoms. Mastitis can result from untreated engorged breast or plugged milk ducts.

A lactating mother who presents the above symptoms must be referred to a physician. Antibiotics and rest are usually prescribed. During treatment, the mother is advised to continue breast feeding using both breasts, especially the inflamed breast.

VI. **RESOURCES FOR BREAST FEEDING MOTHERS**

A. **WIC Program**

The WIC Program (discussed earlier in the lesson on Nutrition in Pregnancy) promotes breast feeding and offers assistance to any woman interested in breast feeding. Benefits and services available to income-eligible breast feeding mothers include food vouchers, nutrition education and medical referral. A breast feeding specialist is available on staff to help with breast feeding related issues.

B. **La Leche League**

La Leche League was founded in 1956 by a group of women who had successfully breast fed their infants and wanted to help other mothers who need someone to talk to about breast feeding. There are chapters across the United States and across the world.
Chapter meeting feature topics on breast feeding; mothers offer and receive advice and get a chance to discuss concerns with other mothers.

The international league also sponsors the Center for Breast Feeding Information which publishes books, pamphlets and a newsletter on breast feeding.

C. **International Lactation Consultants Association (ILCA)**

ILCA is an association of professional lactation consultants who can provide help with difficult medical problems associated with breast feeding.
Anita P. is a 24 year old mother who is breast feeding her one-month old infant son. She is a new WIC participant. You obtain a 24-hour recall from Anita as follows:

<table>
<thead>
<tr>
<th>B: 1 cup orange juice</th>
<th>L: 1 cup refried beans</th>
<th>D: 1 cup refried beans</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 fried egg</td>
<td>2 oz. cheddar cheese</td>
<td>2 flour tortillas</td>
</tr>
<tr>
<td>3 slices bacon</td>
<td>1 cup rice</td>
<td>2 cups vegetable</td>
</tr>
<tr>
<td>2 donuts</td>
<td>2 flour tortillas</td>
<td>soup with 1 oz. meat</td>
</tr>
<tr>
<td>2 cups coffee</td>
<td>12 oz. cola</td>
<td>1 cup low fat milk</td>
</tr>
</tbody>
</table>

Drinks from 4 to 6 cans of 12 oz. cola throughout the day.

DIRECTIONS: (25 points):

1. Compare Anita’s foods intake with recommended amounts in the Daily Food Guide.

<table>
<thead>
<tr>
<th>Food Group</th>
<th>No. of Servings</th>
<th>Anita’s Intake</th>
<th>Recommended Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recommended</td>
<td>Anita’s</td>
<td>Add /Change</td>
</tr>
</tbody>
</table>

2. Summarize your recommendations for Anita to improve her diet.

3. Outline a counseling plan for Anita.
Lesson II-4

NUTRITION ASSESSMENT IN PREGNANCY AND LACTATION

OBJECTIVES:

In this lesson, the student will:

1. Identify nutrition assessment data collected to monitor pregnancy at: (a) initial prenatal visit, and (b) follow-up visits.
2. Use the nutrition questionnaire to identify factors that may prevent adequate nutrition and/or high risk habits/behaviors.
3. Interpret nutrition assessment data after comparing with standards for pregnant women.
4. Identify high risk pregnancies that require further assessment.
5. Identify nutrition assessment data collected prior to and during lactation.

ASSIGNMENTS:


Activity work sheet (1)
Take Home Assignment (1)
Handouts: Prenatal Nutrition Questionnaire
Prenatal Weight Gain Grids (2)

I. MONITORING PREGNANCY

The length of normal human gestation (pregnancy) is 40 weeks. Gestational age or the maturity of pregnancy is calculated from the last menstrual period (LMP). The estimated date of delivery (EDD) ± 2 weeks is calculated using the following equation:

EDC or EDD = 1st day of LMP – 3 months + (1 year + 7 days).

A gestation wheel can also be used to determine EDD (or EDC).

II. NUTRITION ASSESSMENT AT INITIAL PRENATAL VISIT

Nutrition assessment conducted during the initial prenatal visit is determined by week of gestation. As a general rule, the following data are collected:
1. **Dietary Data: Nutrition Questionnaire**

The client should complete the nutrition questionnaire before the initial nutrition counseling session. (See handout/Appendix E-1 “Prenatal Nutrition Questionnaire”). The nutrition assistant should review the responses to the questionnaire and take note of risk factors which may indicate a need for nutrition intervention and/or further assessment. These risk factors include the following:

a. Irregular meals or skipping meals  
b. Food intake that severely restricts calories  
c. Food intake that exclude one or more food groups  
d. Food intake high in nutrient-poor, high-calorie foods, e.g., Kool-Aid, soda drinks, sweets  
e. Use of vitamin-mineral supplements in amounts above the RDA.  
f. Craving for unusual things like dirt, clay, laundry, starch, etc.  
g. Use of tobacco, alcohol, or street drugs  
h. Inadequate income to buy food  
i. Problems that affect food intake like vomiting, heartburn, constipation.

2. **Anthropometric Data: Height, Weight and BMI**

Two of the most important anthropometric measures during pregnancy include the mother’s pre-pregnancy weight and the amount and pattern of weight gain during pregnancy. The pattern of weight gain is more important than the total weight gain.

Accurate measurements of height and weight should be taken at the first prenatal visit. The client’s record should be checked for pre-pregnancy Body Mass Index (BMI). If this is not available, calculate the BMI using the client’s height and recalled pre-pregnancy weight.

\[
\text{BMI} = \frac{\text{Wt. in lbs.}}{(\text{Ht. in inches})^2} \times 705
\]

Example: Pre-preg. Wt. = 125 lbs, Ht. = 5' 1"

Step 1: \(5' 1" = (5\text{ft.} \times 12) + 1 = 60 + 1 = 61 \text{ inches}\)

Step 2: \[
\frac{125}{61 \times 61} \times 705 = 23.6 \text{ BMI}
\]
Interpretation:

(a) Compare BMI to chart on page 237 in the textbook to get relative weight classifications. The chart also gives recommended total weight gain for each weight classification for clients carrying single fetus. Adolescents less than 3 years after menarche should strive for the upper end of the range; women less than 62 inches tall should strive for the lower end of the range. Women carrying twins should gain a total of 35-45 pounds.

(b) Chart the weight gain on a Prenatal Weight Gain Grid (Handouts/Appendixes C-1 and C-2). At each visit, record the weight on the appropriate form and compare the weight change between measurements and the total amount gained with the gain expected for the woman’s relative weight classification (i.e., normal, under or over).

Assess and monitor the pattern of weight change at each visit. A slightly lower or higher rate of weight gain is not of concern as long as there is a progressive increase in weight. Excessive weight gains most likely due to excess calorie intake need a revision of targeted weigh gain and counseling on moderating food intake.

Referrals to a registered dietitian or nutritionist should be made in the following cases:
- overweight
- underweight
- inadequate or excessive weight gain (i.e., weight gain below recommended range or a gain of 8 pounds or more per month).

3. **Biochemical Data: Hemoglobin, Hematocrit and Blood Glucose**

Nutrition screening done at the first prenatal visit include hemoglobin and hematocrit tests to assess iron status and anemia. On or after 24 weeks of gestation, blood glucose level should also be tested.

To evaluate test results, standards or norms for pregnant women must be used. During pregnancy, blood and urine concentrations change from the non-pregnant state. Hemoglobin and hematocrit values are expected to be lower in pregnancy due to a “physiological anemia” that results from the expansion of the woman’s blood volume. Similarly, carbohydrate metabolism also changes so that glucose values are elevated during pregnancy. However, values that are abnormal even for pregnancy may indicate gestational diabetes.

The nutrition assistant should refer the following to the registered dietitian/nutritionist for further assessment:
- presence of anemia (i.e., hemoglobin < 10 gm/dl and/or hematocrit < 30%)
- elevated blood glucose values.
4. **Clinical Data: Physical Signs of Deficiencies and Clinical History**

Signs of malnutrition apparent from physical examination or observed from general appearance of the pregnant woman are similar to those in other adults.

Information collected from the client’s medical history or from the nutrition assessment form will identify factors that may place the client at nutritional risk.

Clinical indicators of high risk criteria that need referral to a registered dietitian/nutritionist include:
- under 16 years of age
- twins or multiple fetuses
- diabetes
- hypertension
- other chronic conditions/diseases
- smoking (≥ 20 cigarettes/day)
- alcohol (≥ 1 oz alcohol/day)
- drug use
- hyperemesis gravidarum (severe nausea & vomiting)
- gastrointestinal disorders
- severe infections
- any heart, liver or kidney disease
- cancer, HIV-AIDS
- mental illness/developmental disability
- eating disorder (anorexia, bulimia)
- homelessness
(Refer to handout/Appendix F-1 *High Nutritional Risk Criteria for Women.*)

**B. NUTRITION ASSESSMENT AT FOLLOW-UP VISITS**

Follow-up appointments are scheduled at appropriate intervals to monitor the progress of the pregnancy and determine priorities for nutritional care. The following should be performed at each of these appointments:
- weight (assess weight gain by plotting on a prenatal weight gain grid)
- re-evaluate diet for deficiencies or excesses
- glucose screen (after 24 weeks).

Priority and appropriate referrals are indicated when any of the following is noted:
- inadequate or excessive weight gain
- inadequate nutrient intake
- multiple gestation
- gestational diabetes mellitus
- anemia
- gastrointestinal problems
- inadequate food resources
C. NUTRITION ASSESSMENT DURING LACTATION

During postpartum and lactation, the client should be weighed at all scheduled appointments so weight status can be monitored. In addition, the following information should be obtained before or shortly after the start of lactation:

1. Adequacy of calcium intake:
   Are calcium-rich foods eaten regularly?
2. Adequate sources of vitamin D:
   Is there adequate exposure to sunlight? Does the diet include vitamin D fortified milk?
3. Sufficient fiber, vitamins and minerals:
   Are fruits and vegetables eaten regularly in the amounts recommended?
4. Sufficient vitamin B12:
   Is the mother a total vegetarian (a vegan)?
5. Sufficient calories:
   Is the mother eating enough calories to support lactation? Is the mother restricting her food intake in an attempt to lose weight?
6. Presence of medical problems that may affect nutritional status:
   Are there medical conditions that affect food intake or absorption?
7. Presence of other factors that affect nutritional status:
   Are there lifestyles (alcohol/drug abuse), poverty, or medications which may interfere with an adequate diet?

Any significant factor(s) gathered by asking these questions should be explored in greater depth for counseling and/or referral as needed.

II. GUIDELINES IN PRENATAL NUTRITION COUNSELING*

A. INITIAL VISIT

Assessment:
1. Screen for risk factors using Prenatal Nutrition Questionnaire.
2. Evaluate adequacy of food intake by comparing to recommended amounts for pregnancy in the Daily Food Guide. Identify need for vitamin-mineral supplementation.
3. Obtain height and pre-pregnancy weight to determine BMI prior to conception and recommended weight gain during gestation.
4. Obtain present weight and week of gestation to begin plotting of weight gain on Prenatal Weight Gain Grid.
5. Check hemoglobin and/or hematocrit values.
Education:
1. Discuss importance of nutrition during pregnancy and lactation. Stress key increases in nutrients – protein, iron, folic acid, calcium, and calories.
2. Explain use of Daily Food Guide for meal planning.
3. Counsel about nutritional supplements
4. Discuss pattern of weight gain during pregnancy.
5. Discuss common nutritional problems associated with pregnancy.

B. FOLLOW-UP VISITS

Assessment:
1. Plot weight on Prenatal Weight Gain Grid.
2. Re-evaluate food intake using Prenatal Diet Intake form.
3. Re-check hemoglobin and/or hematocrit as needed.
4. At or after 24 weeks of gestation, a glucose screen should be done.

Education:
1. Discuss diet-related problems.
2. Give feedback on food intake in relation to dietary intake and food choices.
3. Discuss diet and lactation.
4. Discuss infant feeding.

ACTIVITY II – 4 PLOTTING PRENATAL WEIGHT GAIN

DIRECTIONS:

Calculate EDC and BMI for client A.K.

Plot A.K.’s weight gain on the appropriate Prenatal Weight Gain Grid.

Evaluate pattern of weight gain and give appropriate recommendation(s) and/or referral.

A.K. is a primigravida who is a new client at the prenatal clinic. Her record shows the following:

<table>
<thead>
<tr>
<th>First day of LMP</th>
<th>6/10/96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present date</td>
<td>12/10/96</td>
</tr>
<tr>
<td>Height</td>
<td>5’4”</td>
</tr>
<tr>
<td>Pre-pregnancy Weight</td>
<td>110 lbs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weeks of Gestation</th>
<th>Weight (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>112</td>
</tr>
<tr>
<td>12</td>
<td>114</td>
</tr>
<tr>
<td>18</td>
<td>115</td>
</tr>
<tr>
<td>22</td>
<td>118</td>
</tr>
<tr>
<td>24</td>
<td>120</td>
</tr>
</tbody>
</table>
ASSIGNMENT II – 4: NUTRITION SCREENING ON A PRENATAL CLIENT

Using the WIC Prenatal Nutrition Questionnaire form, complete a nutrition screening on the hypothetical case given. (35 points)

Directions:

1. Answer the dietary history questions on the form using the information given in the hypothetical case study.

2. Write-in the amounts, food and drinks on the form. Then, compare these to the Daily Food Guide for Pregnant/Breastfeeding Women (handout). Evaluate adequacy of food intake.

3. Based on your evaluation of food intake and diet history information, identify factors that may put this client at nutritional risk.

4. Determine if this client needs referral to the nutritionist for further nutrition assessment and counseling.
Karla T. is a 17 year-old primigravida who was referred to the WIC program after tests showed that she was two months pregnant.

An interview with her showed the following: she is a junior in high school living at home with her parents. She has always been weight conscious and has tried several fad diets on and off over the last year to lose weight. She does not drink milk and does not like many vegetables; rarely eats breakfast and when she does, it consists of a glass of juice and a piece of toast; at noon she usually eats an apple or an orange, a bag of potato or tortilla chips, and drinks a can of soda.

After school, she is usually very hungry and snacks on cookies, ice cream and soda pop. Frequently, her evening meal consists of a pizza or hamburger and sometimes a milkshake with her friends after school activities. When she eats dinner with her family she has a more adequate meal, although she takes very small portion. Daily, she drinks about 4 to 5 cups of water a day, 2 cups of coffee, and about 4 to 5 cans of regular soft drinks.

The past two weeks, she has complained of feeling queasy in the morning and actually vomited a couple of times.

A 24-hour recall showed that she ate the following yesterday:

<table>
<thead>
<tr>
<th>Breakfast:</th>
<th>Coffee, black</th>
<th>1 cup</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Toast</td>
<td>1 slice</td>
</tr>
<tr>
<td></td>
<td>Jelly</td>
<td>1 tsp.</td>
</tr>
<tr>
<td>Lunch:</td>
<td>Apple</td>
<td>1 medium</td>
</tr>
<tr>
<td></td>
<td>Tortilla chips</td>
<td>1 oz. bag</td>
</tr>
<tr>
<td></td>
<td>Soft drink, cola</td>
<td>12 oz. can</td>
</tr>
<tr>
<td>Snack:</td>
<td>Chocolate Chip Cookies</td>
<td>4 regular</td>
</tr>
<tr>
<td></td>
<td>Soft drink, cola</td>
<td>12 oz. can</td>
</tr>
<tr>
<td>Dinner (at home)</td>
<td>Baked Chicken</td>
<td>2 ounces</td>
</tr>
<tr>
<td></td>
<td>Lettuce salad</td>
<td>1 cup</td>
</tr>
<tr>
<td></td>
<td>Oil/Vinegar Dressing</td>
<td>1 Tbsp.</td>
</tr>
<tr>
<td></td>
<td>Dinner Roll</td>
<td>1 small</td>
</tr>
<tr>
<td></td>
<td>Margarine</td>
<td>1 tsp.</td>
</tr>
<tr>
<td></td>
<td>Vanilla Ice cream</td>
<td>¾ cup</td>
</tr>
<tr>
<td></td>
<td>Soft drink, cola</td>
<td>12 oz. can</td>
</tr>
<tr>
<td>Snack:</td>
<td>Chocolate Chip Cookies</td>
<td>3 regular</td>
</tr>
<tr>
<td></td>
<td>Soft drink, cola</td>
<td>12 oz. can</td>
</tr>
</tbody>
</table>
Lesson III-1

NUTRITION & ASSESSMENT IN INFANCY
Nutrition During Infancy: Growth, Development and Nutritional Needs

OBJECTIVES:

In this lesson, the student will:

1. Relate how the rate of growth during infancy affects energy and nutrient needs.
2. Identify developmental landmarks that indicate readiness for semisolid foods to be added to the infant's diet.
3. Summarize the nutritional needs of the infant.

ASSIGNMENTS:

MATERIALS: Handout: Sequence of Infant Development and Feeding Skills in Normal, Healthy Full-Term Infants.

I. RATE OF GROWTH IN INFANCY

The first year of life is marked by rapid growth. The infant's birth weight doubles by about 4 months and triples by one year. Length increases by about 50% during the first year. After this period, growth rate slows down until the adolescent growth spurt.

Genetics, environment and nutrition determine rates of gain in weight and height. Overall height is more influenced by genetics. A period of catch-up growth occurs in most infants born small but genetically determined to be longer by shifting percentiles on the growth charts around the first 3 to 6 months. On the other hand, infants born larger but are genetically smaller size tend to grow at their birth rates before the lag-down period becomes noticeable in the chart at about 13 months.

It is important to monitor the infant's growth rates to determine whether energy and nutrient needs are being met. The best way to do this is to plot the infant's weight and length at regular intervals on growth charts prepared by the National Center for Health Statistics (NCHS).

Note: Plotting and interpreting growth charts will be discussed in the lesson on Nutrition Assessment.
II. PHYSICAL AND PSYCHOSOCIAL DEVELOPMENT

Growth and development go hand in hand but development is broader. It refers to the attainment of motor and sensory skills, psychological qualities and physiological changes.

The degree of development during the first year of life is remarkable. Physiological changes particularly of the gastrointestinal tract and the kidneys determine the food choices and feeding approaches that are appropriate. This discussion will focus on the sequence of developmental changes that affect the feeding behavior of the infant.

Sequence of Development of Feeding Behavior

1. Birth to 3 Months
   In very young infants feeding is possible through the reflexes which are present at birth.
   - rooting reflex - causes the infant to turn toward the object that brushes the cheek and open his/her mouth.
   - sucking reflex - causes involuntary movement toward the object that touches the lips with closing and pouting in preparation for sucking.
   - swallowing reflex - as liquid moves into the mouth, the tongue immediately moves it to the back of the mouth for swallowing.
   - extrusion (or thrust) reflex - causes the tongue to push out any food placed on the front part of the tongue. Present until about 4 to 6 months of age.
   - gag reflex - causes infant to gag when an object such as a spoon or solid food is placed in the back of the mouth.
   - no or little saliva - starches poorly digested.
   - head control is poor.

2. 4 to 6 Months
   By the end of the third month, the sucking reflex becomes voluntary, and the infant is able to hold its head erect. The following are developmental signs that the infant is ready for solid foods:
   - rooting and extrusion reflexes disappears,
   - poses lips to receive a spoon and closes lips around it,
   - sits with support and holds head steady,
   - grasps an object placed in the palm and wraps whole hand around it,
   - brings objects to mouth and bites them, and
   - starts to drool, indicating that saliva production has started.
When these changes are noted, single-grain iron-fortified cereals for infants (except wheat) may be introduced.

3. 6 to 8 Months
The following developmental signs indicate readiness to offer beverages from a cup:

- puts lips to the rim of a cup,
- grasps cup rim, spoon, or nipple,
- brings and puts most objects to the mouth,
- sits without support for brief periods, and
- begins to chew starting with rotary motions.

At this point it is appropriate to give water and juices from a cup, strained vegetables and fruits by spoon, and progressing to soft, mashed texture.

4. 8 to 10 Months
- sits alone without support,
- grasps using fingers rather than the earlier palmar grasp,
- transfers objects from one hand to the other,
- releases and re-secures objects voluntarily, and
- begins chewing with up and down movements of the jaws.

A greater variety of foods are added such as meats, egg yolks, yogurt, crackers, and pastas; amount of milk in diet decreases.

5. 10 to 12 Months
Around this time the infant:
- drinks from a cup that is held,
- chews up and down,
- picks up food and other objects with thumb and forefinger (pincer grasp)
- stops drooling,
- feeds self using a spoon, and
- bites crunchy food, spoons and nipples.

The texture of foods can gradually be increased and offer soft whole fruits and vegetables.

Appendix H-1/Handout summarizes the developmental and feeding skills in normal, healthy full-term infants.)
III. NUTRITIONAL NEEDS

A. Energy (Kcalorie)

The energy needs per kilogram of body weight are the highest during the first six months of life. This is to support rapid growth and the remarkably high basal metabolic rate (about twice that of an adult). After the first six months, metabolic needs decrease and growth rate slows down. However, some of the energy saved is used in increased activity.

<table>
<thead>
<tr>
<th>Age</th>
<th>RDA for Energy (Kcals.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 -6 months</td>
<td>108 Kcals per kilogram body weight or 49 Kcals per pound body weight.</td>
</tr>
<tr>
<td>6-12 months</td>
<td>98 Kcals per kilogram body weight or 45 Kcals per pound body weight.</td>
</tr>
</tbody>
</table>

(NOTE: 1 kilogram = 2.2 pounds).

SAMPLE CALCULATION of Energy Needs:

1. Infant who weighs 14 lbs. at 4 months.
   14 lbs. ÷ 2.2 lbs/kg. = 6.4 kgs.
   6.4 kg. x 108 Kcals/kg. = 690 Kcals./day

2. Infant who weighs 18 lbs. at 8 months.
   18 lbs. ÷ 2.2 lbs/kg. = 8.2 kgs.
   8.2 kg. x 98 Kcals/kg. = 804 Kcals./day.

B. Protein

Infants require protein for tissue synthesis during growth, particularly for muscle, skeleton, brain, blood, enzymes, hormones, etc.

The RDA for protein is:

<table>
<thead>
<tr>
<th>Age</th>
<th>RDA for Protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 6 months</td>
<td>2.2 grams/kilogram body weight or 1 gram per pound of body weight</td>
</tr>
<tr>
<td>6 - 12 months</td>
<td>1.6 grams/kilogram body weight or 0.7 gram per pound of body weight</td>
</tr>
</tbody>
</table>

Infants who consume 150 to 200 milliliters of breast milk per kilogram body weight per day receive adequate protein (150 to 200 ml. of breast milk contains between 1.7 to 2.2 grams of protein).

C. Fat and Essential Fatty Acid

Fat is important as a source of concentrated calories, and is needed for the developing central nervous system and maintenance of body temperature. Fat provides about 55% of the kcalories in human milk and about 45-50% in commercial formulas.
The essential fatty acid, linoleic acid, is also needed to prevent fatty acid deficiency manifested by eczema-like dermatitis in infants. Both human milk and commercial formulas are adequate sources of linoleic acid for infants.

D. Water

Infants require more water per unit of body size than do adults. There are several reasons for this: (1) the younger the infant, the greater the percentage of body weight is water, (2) water is easily lost from the infant's body since a larger percentage of water is located in the extra-cellular and vascular spaces, and (3) the immature kidneys are less able to concentrate urine and need more fluid to excrete waste products.

Under normal conditions, 120 to 150 ml. per kilogram body weight per day is recommended. Breast milk or infant formula is usually adequate to provide the recommended amount. However, all infants need supplemental water once they start eating solid foods, especially protein foods.

E. Vitamins

With the exception of vitamin D, the vitamins in breast milk adequately meet the needs of the infant. Physicians routinely prescribe vitamin D supplements for breastfed infants. Commercial infant formulas and cow’s milk are fortified with vitamin D.

At birth, the intestinal tract of the newborn is sterile and therefore, there are no vitamin K producing bacteria. To prevent hemorrhagic disease of the newborn the American Academy of Pediatrics (AAP) recommends a single dose of vitamin K given by injection or orally.

F. Minerals

The rapid growth of infants requires large amounts of iron. Unfortunately, their intake of iron is usually low. For a full-term infant, an iron supplement is recommended starting at 6 months of age if fully breast fed and around 4 months for infants fed on non-iron fortified formula. Iron drops are best absorbed. For a pre-term infant, iron supplementation should be started no later than two months of age.

Fluoride, although not an essential nutrient, is important to help prevent dental caries. A fluoride supplement of 0.25 mg/day is recommended by two weeks of age for all infants fed human milk and commercial ready-to-feed formulas. A supplement is also needed when powdered or concentrated formulas are mixed with water with a fluoride concentration less than 0.3 parts per million.
NOTE: The nutrient needs discussed apply to full-term infants. Pre-term and low birth weight infants have special needs and are best referred to the registered dietitian/nutritionist.

Counseling Pointers: Vitamin and Mineral Supplements

Infants’ diets should not be supplemented with vitamins and minerals during the first year of life unless prescribed by a health care provider. If a supplement is prescribed, it is important that only the dosage prescribed is given to the infant. Excessive amounts of certain vitamins and minerals can be toxic.

The bottle containing the supplement must be kept out of the reach of infants and children. An infant or child who opens a vitamin-mineral supplement bottle can easily consume a toxic amount.

Beginning July 15, 1997, a new FDA rule will take effect to protect children from accidental iron poisoning. Labels on all drugs and dietary supplements that contain iron or iron salts will have to prominently display a boxed warning about accidental overdose of iron-containing products as a leading cause of fatal poisoning in children under six.

Lesson III-2

NUTRITION & ASSESSMENT IN INFANCY
Nutrition During Infancy: Guidelines for Infant Feeding

OBJECTIVES:

In this lesson, the student will:

1. Compare the use of breast milk versus infant formula in feeding infants.
2. Discuss important guidelines in breastfeeding and in formula (bottle) feeding.
3. Describe the process of weaning infants.
4. Outline the recommended sequence and process for introducing solid foods to the infant's diet.
5. Discuss common feeding problems in infancy and their recommended interventions.

ASSIGNMENTS:

MATERIALS:

Videotape: Infant Feeding, National Health Video, Inc.
It's Time for a Cup, County of San Bernardino Department of Public Health, 1993. 
Breast Milk or Formula: Making the Right Choice for Your Baby, FDA Consumer, 1996.
Activity Worksheet (1)
I. BREAST MILK VERSUS INFANT FORMULA

A. Breast Milk

Breast milk is the most nearly perfect food to meet the nutrient needs of the infant. American Academy of Pediatrics (AAP) and the Canadian Pediatric Society have issued a joint statement on breastfeeding: *Breastfeeding is strongly recommended for full-term infants except in the few instances where specific contraindications exist.*

The benefits of breastfeeding to the mother and to the infant were described earlier. In terms of nutrition, breast milk provides all the nutrients a healthy infant needs for the first 4 to 6 months of life except possibly vitamin D. *Colostrum* is the first milk produced during the first few days after delivery. It is high protein, low fat and is rich in antibodies and white cells from the mother's blood that convey immunity to the infant. The colostrum is gradually replaced by mature milk over the first 3 weeks after birth. Concentrations of fat and lactose increase while those of protein and minerals decrease.

The nutritional advantages of mature breast milk for infant feeding include:

1. Protein content is uniquely more suitable for the infant. Protein is about one-third the amount of protein in cow's milk, largely in the form of *whey* proteins (alpha-lactalbumin and lactoferrin) and less *casein* proteins. The whey proteins are easier to digest for the infant. The lactoferrin helps absorb iron into the infant's bloodstream and acts as an antibacterial agent. The lower amount of protein places less stress on the infant's kidneys to excrete urea.

2. Lower levels of many minerals in human milk are absorbed more efficiently and the lower amounts do not unnecessarily increase the mineral waste products presented to the kidneys for excretion (renal solute load).

3. Fat content is higher than cow's milk with considerably greater amounts of the essential fatty acid, linoleic acid. Human milk also contains more cholesterol, which is needed by the rapidly growing central nervous system and the development of certain enzymes.

4. Anti-infective factors contained in human milk protect against infection while the infant's immune system is maturing.
B. Infant Formula

Although breastfeeding is highly recommended because of its many benefits to the mother and the infant, there are valid reasons for not breastfeeding. In this case, there are a variety of commercial infant formulas to choose from which are grouped into three categories:

- standard milk-based
- soy-based
- protein hydrolysates

1. Standard milk-based infant formula

These formulas are made from nonfat cow's milk to which are added carbohydrate (usually lactose), vegetable oils, vitamins and minerals. Casein is the predominant protein in cow's milk. However, some milk-based formulas have been changed to contain more whey.

Standard milk-based infant formulas are usually grouped according to their iron content: (1) iron-fortified, and (2) low-iron. The AAP recommends iron-fortified (9.6 to 12 mg/quart infant formula for all formula-fed infants. The low-iron (1.0 to 1.4 mg./quart) is used for a few medical conditions, and do not meet the iron requirements of the normal infant. (Examples of standard milk-based formulas include Enfamil with iron, Similac with iron, Gerber with iron, and SMA.)

NOTE: The WIC Supplemental Nutrition Program allows the use of iron-fortified formulas only.

2. Soy-based infant formula

These formulas contain soy protein isolate, vegetable oils, and added carbohydrate, usually sucrose and/or corn syrup solids, vitamins and minerals. These formulas are fortified with the essential amino acid, methionine, which is found in limited amounts in soybeans, and with iron in similar amounts as standard milk-based iron-fortified infant formulas.

Soy-based infant formulas are usually prescribed in the following conditions:

- intolerance to lactose,
- intolerance to cow's milk protein,
- galactosemia,
- recovery from diarrhea as temporary feeding until lactase levels are restored in the intestines, or
- strict vegetarian families

Studies have shown that soy-based formulas support normal growth and development in a healthy full-term infant. Examples of
commonly used soy-based infant formulas are Isomil, Prosobee, and Nursoy.

3. **Protein hydrolysate infant formula**

These formulas use casein or whey hydrolysate (simpler derivatives of intact or whole protein) in place of cow's milk or soy protein. Formulas of this kind are used for infants who are allergic to intact proteins of cow's milk or soy protein. Examples of commercially available protein hydrolysate formulas are Nutramigen, Pregestimil, Good Start, and Alimentum.

Infant formulas are available in three forms:
- **ready-to-feed**: pour directly into clean bottles; easiest to use but also the most expensive. Available in 8 ounce and 32 ounce cans.
- **liquid concentrate**: mix with equal part water; relatively easy to use; inexpensive. Available in 13 ounce cans.
- **powdered formula**: must read and follow label directions for preparation; lightest for travel; cheapest form. Available in 12 to 16 ounce or 32 ounce cans.

**NOTE:** The WIC Program allows the use of the liquid concentrate or powdered forms only.
(Refer to handout/Appendix H-2 for guidelines in the preparation of infant formula).

**Milks NOT recommended for infant (first twelve months of life) feeding include:**
Whole cow's milk, evaporated cow's milk, low-fat or skim milk, sweetened condensed milk, goat's milk and imitation milks. Any form of cow's and goat's milk, due to their high protein and mineral content, stresses the immature kidneys of the infant. Whole cow's milk also causes gastrointestinal bleeding and blood loss when fed to infants. In addition, low-fat or skim milk cannot meet the energy and other essential nutrient needs of the infant; sweetened condensed milk has a high sugar concentration. Imitation milks like non-dairy creamer, soy beverage or soy milks, lack appropriate kcalories, protein and other essential nutrients for infant feeding.
II. GUIDELINES FOR INFANT FEEDING

A. Breastfeeding

1. Initiate breastfeeding as soon after delivery as possible. During the first weeks, infants usually require feeding every 2 to 3 hours with 8 to 12 feedings every 24 hours.

2. Frequency of feedings: For infants who are exclusively breastfed, the average number of feedings at different ages are as follows:

<table>
<thead>
<tr>
<th>Age of Infant</th>
<th>Average No. of Feedings/24 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to 4 weeks</td>
<td>8 to 12</td>
</tr>
<tr>
<td>1 to 2 months</td>
<td>7 to 10</td>
</tr>
<tr>
<td>2 to 4 months</td>
<td>6 to 9</td>
</tr>
<tr>
<td>4 to 6 months*</td>
<td>6 to 8</td>
</tr>
</tbody>
</table>

* As solid foods are introduced the number of feedings will over time decrease to 4 per day.

3. Duration of feedings: mothers should follow their infants' lead in determining the length of each nursing and allow the infant to nurse as long as they desire. During the first four months, the average nursing time for exclusively breastfed infants is between 10 to 20 minutes per breast.

4. The infant should nurse from both breasts. Alternate the breast which is offered first. This practice gives both breasts a chance to be emptied and vigorously stimulated every other feeding.

5. A mother can either wait until the infant stops suckling and comes off the breast or break the suction by slipping a finger down to the corner of the infant's mouth under the gums.

6. The infant should be burped at least once between feedings on each breast and after the feeding is over.
Indicators Whether Infant is Getting Enough Milk

Nursing mothers usually ask how they can tell whether their infants are consuming adequate amounts of breast milk. This is a common concern since they cannot see how much milk is consumed.

The following indicators can reassure mothers that exclusively breastfed infants are consuming sufficient amounts of milk:

- gaining weight consistently, e.g. about 4 to 8 ounces per week for the first 6 months, and about 3 to 5 ounces per week during the second six months. Failure to regain birth weight by 3 weeks of age or continued weight loss after 10 days of life suggests that the intake of breast milk is not adequate;
- can be heard swallowing consistently while nursing,
- has 6 to 8 thoroughly wet cloth diapers (or 5 to 6 disposable diapers) per day while not being given any extra fluids,
- excretes urine which is pale yellow or clear;
- has frequent bowel movements each day during the first 6 weeks of life. An infant who has fewer than 4 per day may not be consuming sufficient quantities of milk; and
- sleeps for 2 to 3 hours between feedings.

B. Supplemental Feeding

Supplemental feedings are bottles of infant formula or water fed in between nursings. This practice should be discouraged during the first 4 to 6 weeks of breastfeeding, or before lactation is well established, because the infant may:

- fill up and suckle less on the breast, causing a decrease in milk production,
- experience nipple confusion as nipples on bottles promote a sucking action different from breastfeeding, and
- refuse the breast after being on a bottle.

After lactation is well established, an occasional supplemental bottle feeding can be used while continuing to breastfeed. It is also possible to combine both breastfeeding and formula feeding, but as the number of nursings decrease so does milk production.

C. Formula Feeding

1. Infants should be fed on demand, not a strict feeding schedule. The mother/care giver should recognize and respond to the hunger and satiety cues from the infant.
2. Feeding frequency and amount: Formula-fed newborns are generally fed as often as exclusively breastfed infants are nursed, i.e. 8 to 12 times per day every 1 1/2 to 3 hours and consume 2 to 3 ounces per feeding. An example of a typical formula feeding frequency and amount follows:

<table>
<thead>
<tr>
<th>Age of Infant</th>
<th>Number of Feedings/24 hrs.</th>
<th>Ounces/feeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to 4 weeks</td>
<td>8 to 12</td>
<td>2 to 3</td>
</tr>
<tr>
<td>One month</td>
<td>7 to 8</td>
<td>3 1/2 to 5</td>
</tr>
<tr>
<td>Two months</td>
<td>6 to 7</td>
<td>4 to 6</td>
</tr>
<tr>
<td>Three months</td>
<td>4 to 5</td>
<td>5 to 7</td>
</tr>
<tr>
<td>Four to five months</td>
<td>4 to 5</td>
<td>6 to 8</td>
</tr>
<tr>
<td>Between 6 to 12 months*</td>
<td>3 to 4</td>
<td>6 to 8</td>
</tr>
</tbody>
</table>

* It is recommended that at age 7 months and older, healthy, normal infants who are on solid foods consume no more than 32 ounces of infant formula per day.

3. Find a comfortable place for feeding where the infant can be fed in a calm and relaxed manner.

4. While feeding show the infant lots of love, attention, cuddling and talking gently.

5. Hold the bottle still at an angle so that the end of the bottle near the nipple is filled with formula and not air.

6. The bottle should never be propped to feed an infant. This practice is dangerous because the liquid can accidentally flow to the lungs causing choking or enter the middle ear causing ear infections and because it lacks human contact.

7. Do not give infants a bottle while laying down to rest or nap, lying in an infant seat, or sitting in an infant swing or walker.

8. Do not feed juice or sweetened beverage in a bottle to prevent baby bottle tooth decay.
9. Burp the infant at any natural break in or at the end of the feeding.

10. Partially used formula in bottles should be thrown out after each feeding. Never save for the next feeding.

III. WEANING

A. Weaning the Breastfed Infant

The weaning process begins in part when solid foods are introduced and the infant begins nursing less frequently. Weaning should be done over several days or weeks. Breastfed infants 6 months or older and who are developmentally ready can be weaned directly to a cup; younger, immature infants may need to be weaned to the bottle.

In weaning from the breast, replace the nursing the infant is least interested in with the bottle or cup. Gradually, over several days or weeks the feedings by bottle or cup are increased as the number of nursings are decreased. Infants should be weaned off the bottle entirely and onto a cup by about 12 months of age.

B. Weaning from the Bottle

Weaning an infant from the bottle to the cup is a gradual process that requires learning new skills. It is best to try to offer a cup in place of a bottle at the feeding of least interest or at mealtimes when family members are drinking from the cup. At 6 months, most infants can drink liquids from the cup with some help; after 8 months they learn to curve their lips around the rim of the cup.

Help infants learn how to drink from the cup by:
- introducing 1 to 2 ounces of infant formula, breast milk, fruit juice or water in a small plastic cup (one with a cover and spout works well to start),
- holding the cup for the infant, and
- tilting the cup very slowly so that small amount of liquid empties which the infant can swallow without hurry.
IV. INTRODUCTION OF SOLID FOODS

The developmental signs in infants for readiness for solid foods were discussed in the previous lesson. Other indicators are that the infant birth weight has doubled and is 4 to 6 months old. (Refer to Table 10-7, page 251 in the textbook for suggested progression of solid foods).

Guidelines for Introducing Solid Foods

A. New foods should be introduced one at a time and at intervals of about 5 days before introducing another food. Iron-fortified rice cereal mixed with breast milk, formula or water is tried first, followed by other single-grain cereals. Wheat cereal is offered last since it is the most allergenic of the cereals.

B. Home-prepared or commercial baby foods which are good sources of iron and vitamin C are acceptable.

C. In introducing pureed vegetables and fruits, start with vegetables singly before fruits so the baby will learn to like their less sweet flavors first.

D. With the introduction of solid foods, infants require supplemental water to reduce the risk of dehydration.

E. Foods to omit include the following:
   - sweets including baby desserts - provide empty Kcalories,
   - canned vegetables (not vegetables prepared for babies) - contain too much sodium,
   - honey and corn syrup - risk of botulism,
   - artificially fruit flavored drinks, e.g. Kool-Aid - replace more nutritious foods, and
   - whole grapes, popcorn, hot dogs, carrots, hard candies, nuts, etc. - risk of choking on these foods.

V. FEEDING AND NUTRITION-RELATED CONCERNS IN INFANCY

A. Constipation

Constipation is the condition characterized by hard, dry, small stools which are passed with difficulty. The frequency of bowel movement may not be as important as the consistency of the stools. True constipation is not very common among breastfed infants as well as formula-fed infants although the latter tend to have firmer stools.

Intervention to treat constipation should focus on:
   - adequacy of intake of breast milk or formula,
   - proper formula preparation and dilution,
• appropriateness of solid foods consumed,
• premature introduction of solid foods if infant is less than 4 months old, and
• suggest that an additional 2 ounces of water be given after each feeding. Fruit juices are also acceptable.

B. Diarrhea

Diarrhea is the frequent passage of loose, watery stools. The condition can either be acute (sudden onset) or chronic (long duration). Diarrhea can be caused by a reaction to food, excessive juice intake, infection or medical conditions, use of certain medications, consuming contaminated food or water.

An infant with diarrhea should be referred to a health care provider for medical evaluation. If left untreated, diarrhea in an infant can quickly lead to dehydration which can be life-threatening. Diarrhea lasting more than 3 to 4 days usually need intravenous replacement of fluid and electrolytes. Use of oral rehydration solutions should only be used under medical supervision.

Mothers must be warned that the use of ordinary beverages such as juice, broth, tea, carbonated beverages, Kool-Aid or Gatorade to treat diarrhea may actually worsen the condition and lead to more dehydration. The concentration of these beverages is too high and may cause more diarrhea.

C. Spitting Up and Vomiting

Spitting up small amounts (usually a teaspoon or less) of breast milk or formula after feedings is normal. The cardiac sphincter may not be sufficiently developed to keep all food in the infant's stomach after eating.

Methods to reduce excessive spitting up include:
• burping the infant several times, generally during normal breaks in the feeding and at the end of the feeding,
• holding the infant in an upright position for 10 to 15 minutes after a feeding,
• avoiding excessive movement or play right after eating, and
• not forcing the infant to eat or drink when full.

Gastroesophageal reflux is the spontaneous, effortless regurgitation of stomach contents to the esophagus. Infants with this condition should be referred to a health care provider because of the danger of complications like failure to thrive, recurrent upper respiratory infections, pneumonia, and esophagitis.

Vomiting is the forceful discharge of food through the esophagus and involves a more complete emptying of stomach contents. Vomiting can
place an infant at risk of dehydration. Infants with this problem should be referred to a health care provider for medical evaluation and intervention.

D. Food Refusal

The common causes of food refusal include: (1) lack of developmental readiness, (2) physical illness, and (3) emotional stress.

A sick infant or child will refuse to eat due to lack of appetite. During these times, liquids are better accepted and tolerated than solid food.

Suspect emotional stress as the cause of food refusal under these circumstances: too much stimulation like noise, commotion, tension, etc., or too little stimulation like if the infant is not touched or spoken to during feeding resulting in lack of interest in eating.

The following guidelines may help prevent or remedy food refusal:

- provide and maintain a quiet, relaxed atmosphere,
- before feeding, calm the infant and feed at a slow, relaxed pace,
- respond to signs of hunger and fullness, and
- talk to the infant while feeding.

E. Low-Birth Weight

Infants weighing less than 5.5 pounds at birth (2,500 grams) are considered low birth weight (LBW). Most will be discharged from the hospital either on premature infant formulas, breast milk or standard infant formula with multiple vitamin and/or iron supplements.

LBW infants are high-risk infants and are referred to the registered dietitian/nutritionist for nutrition care. They should also be evaluated for participation in the WIC Program and enrolled in a developmental follow-up program for premature infants.

F. Nursing Bottle Caries

Nursing bottle caries (or baby bottle tooth decay) is a form of severe tooth decay of an infant's primary teeth. To prevent this problem, the following steps are recommended: use bottles only for feeding infant formula, breast milk or a small amount of water.

- Use bottles only for feeding infant formula, breast milk or a small amount of water. Do not feed juice or any sweetened beverage in a bottle.
- Feed bottles of formula or breast milk only at feeding time, not when putting down the infant for a nap or sleep. If the infant falls
asleep while feeding, move him/her slightly to stimulate swallowing before putting down to sleep.

- Do not feed sweetened beverages to infants in either a bottle or cup.
- Never leave a bottle in the infant's crib or playpen,
- Do not allow infant to walk around or sit alone with a bottle for extended periods.
- Do not feed the infant concentrated sweet foods, or add sweeteners to infant's food.
- Never dip the infant's pacifier in honey, syrup, sugar, or other sweetened substance.
- Gradually wean the infant to the cup between 6 to 12 months old so that only the cup is used at 1 year of age.
- Clean the infant's teeth regularly.
- Follow the advice of your dental or medical health provider regarding fluoride needs.

GROUP DISCUSSION/ACTIVITY:

The following are situations or questions that are encountered in the clinics. For each situation/question, summarize the major point you will emphasize in counseling the mother or caregiver.

1. R.T., a new mother is concerned that her 3-month old baby may not be receiving enough breast milk. Weight chart shows the baby is gaining weight at acceptable levels.

2. B.R. is a young mother who asks: "My baby is 2 months old and I'm nursing her. My mother tells me that I need to start giving her solid foods so she'll sleep through the night. I would like to start giving her solids soon."

3. Andy at 7 months old has been drinking one or two bottles of Kool-Aid each day. His mother says, "He really loves it."

4. A.V. tells you that she started giving infant cereal of wheat and oats to her 5-month old baby as the first solid food in his diet.
ANSWERS TO ACTIVITY III-2

1. Reassure R.T. that this is a common concern in nursing mothers since the actual amount of milk being consumed is not seen. Point out that her infant's weight gain is within acceptable range which shows that he is getting enough milk. Also, check with her the other indicators of adequacy: number of times nursed/24 hours; hears infant swallowing while nursing; 5 to 6 wet disposable diapers/day; urine is pale yellow or clear; and adequate bowel movement.

2. B.R. needs to be told that infants are not developmentally ready for solid foods until 4 to 6 months. Before this time, their bodies and skills are not ready for solid foods. Contrary to popular belief, feeding solid foods early will not help infants sleep through the night.

   Point out: signs to look for to indicate readiness for solid foods.

3. Two points to explain to Andy’s mother:
   (a) Kool-Aid should not be given to babies since it is high in sugar and low in nutrients.
   (b) Any drink containing sugar, like Kool-Aid, fruit juices, etc. should not be given in a bottle to prevent baby bottle tooth decay.

4. First cereal to be introduced should be rice since it is least likely to cause allergic reaction.

   Point out: (1) Cereals or any other foods must be introduced singly, not as mixtures.
   (2) Wheat cereal is offered last because it is more likely to cause an allergic reaction.
Lesson III-3

NUTRITION & ASSESSMENT IN INFANCY
Nutrition Screening: Birth to 23 Months

OBJECTIVES:

In this lesson, the student will:

1. Learn indicators used in screening for this age group under each nutrition assessment component.
2. Describe and/or practice correct techniques of weighing, measuring length and head circumference.
3. Plot and interpret measurements on growth charts for length, weight and head circumference.
4. Interpret hemoglobin and hematocrit measurements using reference standards.
5. Enumerate information that should be obtained in taking a health history.
6. Identify data needed in dietary assessment.
7. Determine when referral for further nutrition assessment is indicated.

ASSIGNMENTS:

MATERIALS:

- Growth charts (4)
- Ruler and pencil
- Non-stretch measuring tape
- Video tapes:
- Activity work sheets (2)
I. NUTRITION SCREENING INDICES

The following nutrition screening indices performed accurately by trained staff are effective in identifying infants/children who need to be referred to the dietitian/nutritionist for a more comprehensive nutrition assessment:

**Anthropometric Data:**
- Length
- Weight
- Weight for length
- Head circumference

**Biochemical Data:**
- Hemoglobin
- Hematocrit

**Clinical Data:**
- Gestational age
- Health history
- General physical appearance

**Dietary Data:**
- Usual intake
- Feeding skills
- Eating habits/behavior
- Use of supplements

II. ANTHROPOMETRIC DATA

Growth is the simplest and most basic parameter for the evaluation of nutritional status in children. Changes in weight and length are much more indicative of growth than current weight and length alone. Accurate measurements obtained at regular intervals over a period of time establishes the child’s growth pattern. Accurate measurements require (1) suitable equipment, (2) standardized procedures, and (3) well-trained personnel.

Recommended measurements for children from birth to two years include:
- recumbent length — used to assess growth
- weight for length — used to assess body mass
- head circumference — closely related to brain growth

A. Length

Recumbent (lying down) length is used to measure children less than 24 months of age. It is an indication of long-term nutrition, especially protein status.

1. **Standard Equipment**
   A special measuring board with a stationary headboard and a moveable sliding footboard that is perpendicular to the backboard. Measures in millimeters or inches with its zero end at the edge of the headboard.
2. **Standard Procedure**
   (Two adults are needed to do this measurement)
   - Have mother remove shoes, socks, clothing, and any hair objects, such as rubber bands, etc., from hair.
   - Lay the child face up on the measuring board. Align the body straight with the center line of the backboard.
   - Have the other adult hold the child’s head firmly against the headboard until the measurement is taken.
   - With one hand, hold the child’s knees and straighten the shoulders and buttocks so these touch the backboard.
   - With the other hand, slide the footboard against the bottom of the feet with toes pointing upward.
   - Read the measurement to the nearest 1/8th inch (1 mm) and write it down.
   - Slide the footboard away and start again. Take as many measurements and write each one down until two readings agree within 1/4 inch (1/2 cm.).
   - Record the final measurement on the child’s chart immediately.
   - Sanitize the measuring board.

B. **Weight**

In children, weight is a sensitive indicator of growth, an early clue to growth problems and nutritional inadequacy. Weight reflects more recent nutrition of the child (or adult) than does height.

1. **Standard Equipment**
   a. For infants and children too young to stand without assistance:
      A pan-type pediatric beam-balance scale or electronic scale with non-detachable weights. The scale must be accurate to within 1/2 ounce (10 gm).
   b. For children and adults who can stand without assistance:
      A platform-type, beam-balance or electronic scale that is accurate to 1/4 pound (0.1 kg). Bathroom or other spring-operated scales are not accurate and should not be used.

For both types of scales, the zero weight on the scale’s horizontal beam should be checked periodically and after the scale has been moved. To do this, slide the main and fractional weights to their respective zero positions and adjust the zeroing weight until the scale is in balance. Two or three times a year, the scale should be checked for accuracy using a standard set of weights to re-calibrate.
2. **Standard Procedure**

Weight should be obtained with the infant wearing only a dry diaper, and for children in underwear or standard clinic gown; no shoes.

- Remove all clothing except a dry diaper.
- With the scale balance and the weights in the zero position, place the undressed infant/child on the center of the scale.
- Move the main beam weight away from zero until the indicator drops below the center point. Then move the weight back toward zero until indicator is just above the center point.
- Move the fractional beam weight away from zero until the indicator is centered.
- Read the weight to the nearest 1/2 ounce (10 gm). Repeat the measurement until two weights agree to within 1/2 ounce (10 gm).
- Record the second reading of the two readings that agree within 1/2 ounce on the child’s chart immediately.
- Return both weights to zero.
- Sanitize the scale.

**C. Head Circumference**

Head circumference measurement is an important screening procedure to detect abnormalities of head and brain growth, especially in the first year of life. It is normally indicative of brain growth and size. Full-term infants are estimated to have completed two-thirds of their brain growth by two years of age. Brain growth is dependent on adequate calories and protein, and in the absence of non-nutritional factors that may affect it, provides clues regarding the child’s nutrition.

1. **Standard Equipment**

   A flexible, non-stretchable tape that is 6 mm to 12 mm wide, made of laminated paper, fiberglass or plastic. Insertion tapes have an opening for the tape to slip through which makes reading the measurements easier.

2. **Standard Procedure**

   It is recommended that head circumference is measured routinely in infants and children up to age 36 months.

   - Seat the infant on the lap of an adult.
III. INTERPRETING ANTHROPOMETRIC MEASUREMENTS

A. Reference or standard

The infant’s weight at birth is compared to normal standards as follows:

- Low birth weight — less than 5 pounds, 8 ounces or less than 2500 grams.
- High birth weight — more than 8 pounds, 13 ounces, or more than 4000 grams.
- Normal birth weight — any weight more than 5 pounds, 8 ounces, but less than 8 pounds, 13 ounces.

The National Center for Health Statistics (NCHS) growth charts are used as reference to compare measurements of an infant or child with other infants or children in the U.S. of comparable age and sex (See Appendix E, pages E-1 to E-8, in the textbook for the charts). These charts have a series of percentile curves that represent acceptable ranges of body size according to age and sex. The values in the charts are “reference data” rather than “standard” since the values represent the population as it exists and not what is ideal or optimal.

Reference data on the charts are presented as seven percentile curves: 5, 10, 25, 50, 75, 90 and 95. Percentile is a series of measurements in increasing order which gives an average value for an entire population or reference group. The percentile indicates the position where a measurement falls in a series of 100 measurements, e.g., if a plotted measurement for an infant is on the 75th percentile for length, 75% of infants of the same age and sex would be shorter, whereas if the measurement were at the 10th percentile, only 10% of infants of the same age and sex would be shorter. The 50th percentile is considered the average or median value, and values between the 15th and 85th percentile are generally considered within normal limits.

Charts to use for ages birth to 36 months include:

- length for age,
• weight for age,
• head circumference for age, and
• weight for length

B. Using the Growth Charts and Plotting Measurements

Measurements of infants/children less than 24 months are plotted on the birth-to-36 months charts — blue charts for boys, and pink charts for girls. Since chronological age is a very important variable in growing children, the exact age must be known before plotting age-dependent measurements. Age should be calculated to the nearest month when using the birth-to-36 months chart.

The measurements should be recorded numerically in the designated area on the chart and then plotted on the graphs as follows:
• Locate the child’s age on the horizontal scale.
• Follow a vertical line from that point to the horizontal level of the child’s length, weight or head circumference.
• Mark with an “X” where the two lines intersect.
• Note the nearest percentile curve where the “X” mark falls.

Each time the child is measured, draw a line through the plotted points, i.e., the “X” marks to establish the child’s growth pattern.

NOTE: In weight for stature (length) charts, length is on the horizontal scale and weight on the vertical.

C. Interpreting Growth Data

In most cases, human growth occurs along a predictable and fairly uniform pattern. By itself, growth data cannot be used to diagnose disease, but can show unusual growth patterns which can be a clue to a problem. Two factors are important to note:
• the child’s growth as it compares with the reference population of the same age and sex, and
• any deviation or change from the child’s usual growth pattern.

The second factor is more significant. A sharp drop or gain (i.e., cross two percentile lines) indicates a need for further evaluation.

Measurements and monitoring of physical growth are used in child health care to:
• detect delayed or abnormal growth,
• aid in assessing suspected growth abnormalities,
• evaluate response to treatment for abnormal growth, and
• reassure parents/caregivers about their child’s growth.

Referrals for further assessment are needed in these cases:
• any of the measurements plotted are above the 95th percentile or below the 5th percentile, and
NOTE: Discuss “Guidelines for Interpreting Growth Charts”.

III. BIOCHEMICAL DATA

Biochemical or laboratory tests are essential for confirming existence of deficiencies or excesses that are suspected from other nutrition assessment parameters.

The most common nutrient deficiency problem in infants and toddlers is iron-deficiency anemia. Many clinics or programs screen for iron-deficiency anemia using hemoglobin and/or hematocrit blood tests.

Hemoglobin test measures the concentration of hemoglobin (the iron-containing red pigment in the blood which carries oxygen from the lungs to the tissues) in the blood. Hematocrit measures the percentage of packed red cells in whole blood.

Results are compared to a standard. Values for both hemoglobin and hematocrit vary with age and altitude. There are no standards for infants less than six months. Each child between 6 and 15 months should have at least one hemoglobin or hematocrit value recorded. Current standard from the Center for Disease Control (CDC) for anemia in infants/toddlers 6 to 23 months:

<table>
<thead>
<tr>
<th>Altitude</th>
<th>Hemoglobin</th>
<th>Hematocrit</th>
</tr>
</thead>
<tbody>
<tr>
<td>feet</td>
<td>mg/dl.</td>
<td>%</td>
</tr>
<tr>
<td>0 - 2999</td>
<td>&lt; 11.0</td>
<td>&lt; 33</td>
</tr>
<tr>
<td>3000 - 3999</td>
<td>&lt; 11.2</td>
<td>&lt; 33.2</td>
</tr>
<tr>
<td>4000 - 4999</td>
<td>&lt; 11.3</td>
<td>&lt; 33.3</td>
</tr>
<tr>
<td>5000 - 5999</td>
<td>&lt; 11.5</td>
<td>&lt; 33.5</td>
</tr>
<tr>
<td>6000 - 6999</td>
<td>&lt; 11.7</td>
<td>&lt; 33.7</td>
</tr>
<tr>
<td>7000 - 7999</td>
<td>&lt; 12.0</td>
<td>&lt; 34.0</td>
</tr>
</tbody>
</table>

IV. CLINICAL DATA

Clinical data refers to physical and medical information about the child's past and present health, as well as health habits and environment. A health history is used to screen for conditions that put the child at high risk for malnutrition. (Review Conditions Affecting Nutritional Status, Lesson I-1, page 2.)

The health history should include the following information:

- presence of an illness, its nature and duration,
- effect of illness on eating,
- chronic conditions,
- weight loss or gain over a period of time, and
use of medications.

In addition to the health history information, the general physical appearance of the child should be noted. Therefore, when doing nutrition screening, the child must be present. Most helpful to note are pallor or paleness, apathy, irritability, signs of infection, dermatitis, edema, and excessive bruises. The condition of the gums and teeth should also be noted.

Referrals for further assessment should be made when a high risk condition(s) affecting nutritional status is/are revealed.

V. DIETARY DATA

Screening dietary data from birth to 23 months provides information on the usual food and liquid intake, feeding skills, eating behavior, and the use of supplements. (Refer to handout/Appendix E-3 Infant Nutrition Questionnaire, Department of Health Services, WIC Program.) The questionnaire is completed by the parent/caregiver.

Reviewing the answers to the questionnaire and comparing to recommended standards will identify nutritional need(s).

A. Food and Liquid Intake

The screening questionnaire should include the following information on food and liquid intake:

- method of feeding (breast or formula),
- with breast feeding — number to time nursed per day, approximate number of minutes nursed, if one or both breasts are offered,
- with formula feeding — type of formula used, method used for mixing the formula, the number of ounces per feeding, and number of feedings per day,
- other beverages and foods eaten — kinds and amounts, and
- approximate age when a food was introduced.

B. Feeding Skills

Five reflexes are present at birth. These reflexes enable the infant to feed because at this time feeding is not a voluntary action. These reflexes include the rooting, sucking, swallowing, extrusion and gag reflex.

Around four to six months, the full-term infant shows signs that indicate readiness for solid foods. These signs include:

- begins to drool (indicates initial production of salivary amylase)
- extrusion reflex disappears
• chewing motion begins
• sitting with support
• pursing lips to receive a spoon
• closing lips around the spoon
• maintaining hold of an object placed in hands
• mouthing objects.

Other developmental milestones of feeding skills are:

6 to 8 months:
• puts lips to the rim of a cup
• puts more objects to the mouth
• grasps a spoon, nipple, or rim of a cup
• sits unsupported for brief periods
• starts voluntary biting and early chewing.

8 to 10 months:
• sits without support
• feeds self with finger foods (usually refuses to use spoon at this time).

10 to 12 months:
• drinks from a cup
• chews up and down
• eats family foods
• self-feeds with a spoon
• stops drooling.

24 months:
• has 14 to 16 teeth
• begins to select foods
• pre-term infants have generally caught up with full-term infants.

C. Eating Behaviors or Habits

Information on eating behaviors/habits is part of dietary data. These include:

• appetite
• regularity of meals
• times of meals and snacks
• eats alone or with family
• number of meals eaten away from the family
• time of day when most hungry.
D. Use of Supplements

Information on the use of vitamin and mineral supplements should include:

- type of supplement used (brand and any added nutrients)
- dose that is given and when
- number of times a day.

Referrals for further assessment are needed in these cases:

- food intake or behavior/habit that clearly puts infant at high-risk for malnutrition
- failure to respond to any one of the five reflexes
- developmental skills are not met.
ACTIVITY III-3A – PLOTTING AND INTERPRETING GROWTH CHARTS

Directions: Do Section Project: Section I in your textbook on page 409 - a and b only.

ACTIVITY III-3B – NUTRITION SCREENING

Directions: Read the following case scenarios, do a nutrition screening based on available information, then answer the following questions: (1) List the nutrition assessment parameters (ABCD) that puts the client at nutritional risk; (2) decide whether the client needs referral for further assessment, and why? Use appropriate charts to read percentiles.

CASE A: Emil is 12 months old. He now weighs 27.5 lbs. (his weight at 6 months was 18 lbs. and at 9 months was 22.5 lbs.) His length measurements have remained in the 70th percentile. His mother states on the questionnaire that he drinks Kool-Aid from his bottle or sometimes from the cup. She also noted that he has been "lazy" lately. His medical referral form shows a hematocrit of 29.5% and a hemoglobin of 9 mg/dl. You also noticed that Emil looks chubby but quite pale.

CASE B: Anita is eight months old. She now weighs 18 lbs. (previous weight at 3 months was 12 lbs.) Her hematocrit value is at 34% and hemoglobin measures 12.5 mg/dl. Her mother notes in the questionnaire that Anita has been eating some solid foods since six months and recently some crackers. However, the last two weeks, she refuses the crackers and eats less of other foods and seems very irritable and drools a lot more. Closer examination showed that Anita has some teeth erupting and her gums are reddened. Otherwise, everything else looks normal.
ANSWERS TO ACTIVITY III-3A

a. Refer to completed growth chart.

b. Assessment: The length, weight and head circumference measurements show that this child at birth falls slightly above the 5% percentile. However, at one month of age, the measurements started falling progressively below the 5th percentile, with weight showing the greatest percentile drop at 9 months. No catch-up growth occurred through 21 months, the last measurement available.

c. Referral: The child should be referred for further assessment around 3 months of age because (1) measurements fall below the 5th percentile, and (2) change in the usual percentile level.

ANSWERS TO ACTIVITY III-3B

CASE A: The following nutrition assessment parameters put Emil at nutritional risk:

1. A: His weight has shown an upward trend in percentiles – increased from about 82nd percentile at 9 months to over the 95th percentile at 12 months, while his length remains at 70th percentile.

   B: Both his hematocrit and hemoglobin values are below the levels that indicate anemia.

   C: Observed to be chubby and pale.

   D: Mother says Emil drinks Kool-Aid.

2. Emil should be referred to the nutritionist for further assessment. His weight has jumped two percentiles in three months; lab values and pallor indicate iron-deficiency anemia; intake of Kool-Aid which is high in sugar but low in nutrients.

CASE B: 1. Anita's weight measurements remain at the 50% percentile. Her hematocrit and hemoglobin do not indicate anemia. Her feeding skills seem to be as expected.

   2. At this point, no referral is necessary. Anita's decreased desire to eat may be due to teething/sore gums. Her mother needs to be counseled on how to relieve the pain from teething. Follow-up on this problem is needed.
Lesson IV-1

NUTRITION & ASSESSMENT DURING CHILDHOOD
Nutritional Needs of Children Ages 1 to 6 Years

OBJECTIVES:

In this lesson, the student will:

1. Describe growth and development patterns of children ages 1 to 6 years.
2. Identify nutrient and food needs of children ages 1 to 6 years.
3. Plan an appropriate one day meal pattern that meets the child's nutrient needs.
4. Discuss guidelines for parents and caregivers to promote healthy eating habits.

ASSIGNMENTS:

Take-home assignment (1).

I. GROWTH AND DEVELOPMENT PATTERNS

After the age of one year, the child's growth rate slows but the body continues to grow and change dramatically. Some of the major growth and developmental patterns include:

- weight gain approximates 4 to 6 pounds per year,
- length (height) increases approximately 3 inches per year,
- muscle and bone mass and density increase, while body fat decreases,
- long bones get longer and muscles continue to increase,
- brain growth is 75% complete by the end of the second year, and complete by 6 to 10 years of age,
- appetite constantly changes in response to rate of growth, i.e. appetite increases during periods of rapid growth, and decreases during slow growth periods,
- normal growth differences between individual children become apparent as the child's *growth channel* (progressive regular growth pattern of children) is established,
  (NOTE: Any deviations from this growth channel over time need further evaluation).
- acquisition of skills that allow independence in self-feeding/eating,
- development of individual food preferences,
- development of gross motor skills resulting in increased activity such as running, pulling, lifting, pushing, sliding, etc.,
• hand-to-mouth coordination continues to develop and a 3 year old is able to use a small fork, drink from a straw,
• fine motor coordination increases and the child can safely handle dishes, utensils, and use a table knife to spread foods by 3 to 6 years of age,
• development of a perception of self as distinct from others, manifested in the child becoming more assertive and wanting to make his/her own choices by age 2 to 3, and,
• development of self motivation, increased attention span and willingness to conform and cooperate by age 3 to 6.

II. NUTRIENT NEEDS

Although the child's growth rate has slowed down, the nutrient needs remain proportionately higher when compared to adult needs. Good nutrition is an essential factor to enable the child to achieve his/her full physical and intellectual potential.

A. Energy

At age one, a child needs about 1000 Kcalories daily; and 1300 Kcalories by age 3; and about 2000 Kcalories daily by age 10. Children who are physically active will need more Kcalories while inactive children can become overweight even if they eat less Kcalories.

B. Protein

Protein is essential for maintenance of tissue, synthesis of new tissue (like the increase in muscle and bone mass), provides materials for synthesis of plasma, hormones, enzymes and antibodies.

The recommended protein intake is given below:

<table>
<thead>
<tr>
<th></th>
<th>Recommended Dietary Allowances of Protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 3 years</td>
<td>1.2 grams/kilogram body weight 16 grams/day</td>
</tr>
<tr>
<td>4 - 6 years</td>
<td>1.1 grams/kilogram body weight 24 grams/day</td>
</tr>
</tbody>
</table>

Inadequate protein intake has not been a problem in North America. Children who consume a vegan diet (strict vegetarian) will need to combine foods carefully so that incomplete plant proteins will complement one another to achieve an overall adequacy of essential amino acids needed for growth.

C. Fat

Fat in the child's meals is an important source of concentrated source of energy, carry fat soluble vitamins and provide essential fatty acids. One to 2 % of total kcalories should come from linoleic acid, an essential fatty
acid. Deficiency of linoleic acid results in poor growth and a severe skin condition known as essential fatty acid deficiency eczema. To meet the recommended amount of essential fatty acid in the child's diet, it is necessary to use whole milk rather than low fat or skim milk until the child is two years old and eating a variety of other foods that contain fat.

D. Minerals and Vitamins

Minerals and vitamins are needed for normal growth and development. Inadequate intakes result in slow growth rates, inadequate mineralization of bones, insufficient iron stores and anemia. Stores of other nutrients will be unavailable to meet the increased demands of adolescent growth spurt.

The child's mineral and vitamin needs can be met adequately by a variety of foods from the five food groups. It is important that the child's diet includes the recommended amounts of milk and other dairy products since these are the major sources of calcium and phosphorus; also, foods high in iron to prevent iron-deficiency anemia, the most common nutritional deficiency, including children 4 to 24 months of age.

After infancy, vitamin supplementation of children's diets should be recommended only after careful evaluation of the child's food intake. The committee on Nutrition of the American Academy of Pediatrics has defined six groups of children who are at risk and for whom vitamin supplementation may be appropriate.

The groups include children who:
- suffer from parental neglect or abuse,
- have anorexia, poor appetites, poor eating habits, or who consume fad diets,
- have chronic disease,
- are on restricted diets to manage obesity,
- eat vegan diets, and
- are pregnant.

E. Fluids

Adequate intake of fluid is important. Young children, just like infants, can quickly become dehydrated if they have fever, diarrhea or vomiting and fluid losses are not replaced.

Fluids for children include 16 to 24 ounces of milk, 2 to 4 ounces of juice, and water to meet thirst needs.
III. PLANNING MEALS

In planning meals for toddlers and preschoolers, it is important to become familiar with appropriate portion sizes. As a rule, it is better to offer a child less to eat and allow requests for second servings than to overwhelm the child with large portions. Children in this age group usually eat 5 to 6 small meals per day. (Table 16-1 page 394 in the textbook gives the food groups, suggested serving portions, and total number of servings per day, for ages 1 to 3 years, 4 to 6 years, and 7 to 12 years.)

In order to expand the child's familiarity and develop a wide range of food preferences as he/she grows older, an effort should be made to introduce a variety of tastes, textures and colors as appropriate for age and stage of development.

Food Preferences of the Preschool Child

1. Single foods are more acceptable than combination dishes.
2. Finger foods are popular because these can easily be handled by the child.
3. By the age of three, raw vegetables are often more acceptable than cooked ones. However, raw vegetables like carrot sticks should not be given to younger children because of the risk of choking.
4. Eggs, cheeses, fish, poultry and cooked legumes are preferred protein sources because these are easier to chew than red meats until the age of 2 ½ years when the rotary chewing motion is developed.
5. Dry foods are usually difficult for the preschooler to swallow and should be combined with moister foods.
6. Warm foods rather than hot foods are preferred.
7. Highly colorful foods and properly prepared foods that retain the texture, e.g. vegetables cooked until just easily cut, have the greatest appeal.
8. When introducing new foods, offer them one at a time - only in small amounts at first. Since the more often a food is presented the more likely the child will accept the food, continue to present the food regardless of acceptance.
9. Children like to eat with other children and are more likely to eat non-preferred foods when their peers eat those foods.

IV. DEVELOPING HEALTHY EATING HABITS

During the preschool years, children not only develop the fine motor skills to feed themselves and a sense of self but also the groundwork for their eating habits.

The decreased rate of growth and reduction in appetite and food intake may be a cause of worry in parents, particularly first time parents, and change feeding dynamics. Some children realize quickly that they can manipulate their overly
concerned parents with food. Parents should be aware that the drop in food intake is normal for this age group and not coax their children to eat. It is more important for parents to make available a well-balanced variety of nutrient-dense foods for their preschoolers than worrying.

- Discourage unacceptable behavior (e.g. standing at the table, playing with food, etc.) by removing child from the table to wait and eat later. Be consistent and firm but not punitive.
- Allow the child to explore and enjoy food, including eating with the fingers until use of the spoon is mastered.
- Do not force food on the child or coax the child to eat. It is normal for a child to reject new foods. Acceptance of new food is more likely after familiarity through repeated opportunities to taste it.
- Offer a well-balanced variety of nutritious foods. Let the child choose which to eat and how much. Gradually, the child will develop a taste for different foods.
- Limit sweets. Young children do not have room in their daily energy allowance for empty Kcalorie foods. Do not use sweets as a reward for eating meals.
- Make mealtimes enjoyable, not a battleground. Teach children healthy food choices and eating habits in a pleasant, loving environment.
- Never force children to clean their plates. This practice can lead to behaviors that lead to obesity. Instead, encourage children to listen to their bodies and stop eating when full.

V. FEEDING & NUTRITION ISSUES IN THE PRESCHOOL CHILD

A. Feeding Concerns

Some of the common feeding concerns encountered in the preschool child include:
- rejecting new foods,
- poor appetite and refusal to eat,
- dawdling and playing with food,
- food jags or binge eating of a specific food, excessive sweets, and
- choking on food.

B. Nutrition Issues

The four common nutrition-related health problems of young children in the United States are:
- iron deficiency anemia,
- dental caries,
- obesity, and
- food allergies.
1. **Iron deficiency anemia**

Iron deficiency anemia is the most common nutrient deficiency among children in the U.S. Most common age of occurrence is between 1 and 3 years.

Iron deficiency decreases the energy level of the child since iron carries oxygen in the blood and transports oxygen within cells where it is needed to produce energy. A more lasting and damaging effect of iron deficiency is on the child's behavior. Iron is used to make neurotransmitters, particularly those that regulate the ability to pay attention. Iron deficiency directly affects attention span, mood, learning ability and intellectual performance. Since there is indication that impairment of mental development is not reversed after the deficiency is corrected, prevention of iron deficiency should be a top priority.

Preventive measures include:
- limit milk intake to a total of 3 to 4 cups daily so as not to displace iron-rich foods,
- include iron-rich foods in meals and snacks,
- include vitamin C-rich foods/drinks with non-meat iron sources to increase absorption of iron, and
- check to make sure foods eaten provide about 10 milligrams of iron per day; if not, an iron supplement of 10 milligrams may be needed.

2. **Dental Caries**

Dental caries is a widespread problem that affects children of all ages and family income levels. Good nutrition is important in the formation of sound teeth and the structures that hold them and of the later susceptibility to caries. After the teeth has erupted, three factors interact in the control or development of caries: (1) composition of the diet, especially presence of sucrose (the most cariogenic carbohydrate), (2) presence of acid-producing bacteria contained in dental plaque (a sticky, gelatinous mixture on the crowns of the teeth), and (3) saliva, which acts as a buffer to raise the pH and provides mechanical cleansing of the teeth.

The acid produced when bacterial interacts with dietary carbohydrates degrade the enamel and dentin of the teeth resulting in dental caries.

Preventative measures include:
- decrease the intake of sucrose-containing food in both amount and frequency,
- avoid solid, soft, sticky sweets which can adhere to the teeth,
• offer any sucrose-containing foods at mealtimes only,
• encourage the child to snack on crisp or fibrous foods,
• avoid keeping sucrose-containing items (such as cough drops, gum, breath mints, soft drinks, etc.) in the mouth for long periods of time,
• encourage a regular habit of daily brushing and flossing after meals, and brushing or rinsing after snacks,
• make sure the child receives a daily intake of fluoride, either through water, drops or tablets. However, fluoridated toothpaste is not recommended under the age of 3 because too much may be ingested from swallowing the toothpaste, and
• visit the dentist for cleaning and check-up regularly.

3. **Childhood Obesity**
The incidence of obesity is high between the ages from birth to four years and seven to eleven years. It is important to monitor rates of growth, particularly, appropriateness of weight for length or height, and deposition of adipose tissue. Children who are accumulating more fat than would be expected are candidates for weight control measures. These include:

• emphasize foods that provide a balance of nutrients as well as appropriate Kcalories to reduce rates of weight gain but not to achieve weight loss,
• modify family meals to include fewer (or not at all) fried foods, less gravy, fewer desserts, etc.,
• set appropriate examples as parents/caregivers in terms of food choices,
• respond appropriately to the child's cues of hunger and satiety,
• train children to eat slowly,
• work with baby-sitters, teachers, etc. to modify foods offered as snacks or special occasion treats and
• offer and encourage opportunities to increase level of child's physical activity.

4. **Food Allergies**
The occurrence of food allergies is highest in the first several years of life and tends to decrease with age. The term *food allergy* is usually used as a catchall term for any adverse reaction to food. However, a true food allergy involves the body's immune system reacting to a food protein or other large molecule with the production of antibodies, histamines, etc. Food allergies always involve antibody production whereas *food intolerances* involve symptoms without antibody production.

Although not all food allergies show symptoms, those that do can produce different symptoms: Nausea or vomiting, skin rashes,
inflammation of nasal and lung passages, and asthma. A severe all-system reaction is anaphylactic shock.

Diagnosis of true food allergy requires time-consuming food challenges. Once the offending food is identified, it is removed from the diet. The parent should then be counseled on what non-offending food of equal nutritional value to substitute so as not to compromise the child's health.

Foods that most often cause immediate allergic reactions are listed below.

<table>
<thead>
<tr>
<th>Cause 91% of all adverse reactions:*</th>
<th>Others:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuts (43%)</td>
<td>Wheat</td>
</tr>
<tr>
<td>Eggs (21%)</td>
<td>Peanuts</td>
</tr>
<tr>
<td>Milk (18%)</td>
<td>Chicken</td>
</tr>
<tr>
<td>Soybeans (9%)</td>
<td>Fish</td>
</tr>
<tr>
<td></td>
<td>Shellfish</td>
</tr>
<tr>
<td></td>
<td>Mollusks</td>
</tr>
</tbody>
</table>

DIRECTIONS:

Using Appendix G/Handout as a guide, plan meals and snacks for one day for a two-year old child. Meal plan will be graded for: (1) Adequacy of nutrients, (2) appropriateness of portion sizes, (3) appropriateness and appeal of foods included. (Please use the form given here). (25 points)

<table>
<thead>
<tr>
<th>MEAL/SNACK</th>
<th>MENU (Specify type of food)</th>
<th>AMOUNT</th>
</tr>
</thead>
</table>

Lesson IV-2

NUTRITION & ASSESSMENT DURING CHILDHOOD
Nutritional Needs of Children Ages 6 to 9 Years

OBJECTIVES:

In this lesson, the student will:

1. Describe the growth and development patterns of children ages 6 to 9.
2. Discuss nutrient needs as these relate to growth and development patterns.
3. Give recommendations on appropriate foods, serving sizes and meal pattern.
4. Discuss common feeding and nutrition-related issues during childhood and ways to prevent/manage them.

ASSIGNMENTS:

MATERIALS: Videotape: Eating Healthy for Kids, CNN Series, 1994
Activity Worksheet (1)

I. GROWTH AND DEVELOPMENT PATTERNS

The elementary school years are sometimes referred to as a period of latency. Although growth continues, growth rate is much less than that of infancy or the teen years.

Children gain 2½ to 3 inches per year in height and 4 to 6 pounds in weight up to age seven or eight years. After this, growth rate slows down until the adolescent growth spurt, which occurs around 9 to 14 years of age in girls and 11 to 16 in boys.

Along with physical growth school age children develop increasing maturity and responsibility in caring for self including food selection and preparation. During these years, caregivers should give attention to developing good health and nutrition habits. Good dietary and exercise practices should be encouraged and well-planned, tasty meals served. Since children spend more time in school, the influence of their peers, teachers and experiences will be significant and often the parents' credibility is questioned.
School age children also have greater access to grocery stores and vending machines; have some responsibility in selecting and preparing their own breakfasts, lunches and snacks. Unfortunately, the food choices may not be as healthy when parents lose control over the selection of food. In addition, hectic schedule leads to skipped meals, and excess TV watching encourages unhealthy snack foods and decreased physical activity.

II. NUTRIENT NEEDS

Optimum nutrition remains to play an important role in the growth and development of children during this time. Adequate nutrition is needed to:
• provide nutrients needed for growth,
• furnish the energy needed for the vigorous physical activities,
• maintain resistance to infections, and
• build adequate stores of nutrients to meet the growth demands of the teen years.

A. Energy

Energy and nutrient needs are not significantly affected by gender until children reach the age of 10 years. Recommended energy (Kcalorie) intakes for ages 4-6 years is 90 Kcalories per kilogram per day and for ages 7-10 years, 70 Kcalories per kilogram per day. The amount of Kcalories of the total that is needed for physical activity varies among children and in individual children from day to day. The most appropriate indicators of adequacy of energy intake are the rate of growth using growth charts and the measurements of body fat.

B. Protein

Recommended dietary allowance for protein for ages 4 to 6 is 1.1 grams per kilogram body weight, and for ages 7 to 10 years is 1.0 grams per kilogram. Adequacy of a child's protein intake should take into account other factors such as quality of protein foods eaten, combinations of foods that provide complementary amino acids, energy intake as well as vitamin and mineral intakes. Adequacy of growth rate is a good indicator that protein needs are being met.

C. Nutrients of Special Concern

1. Vitamins

Low serum levels of vitamin C were found in many children particularly if citrus fruit or juices are not included in the diet. The inclusion of at least one serving of a vitamin C rich food such as fresh citrus fruit, pure fruit juices (not fruit drinks), berries, tomatoes, bell pepper, and cabbage should be advocated.
Vitamin A is another nutrient that may be low in children's diets. Three servings of milk, yogurt, and cheese and at least one serving of dark green leafy or dark yellow vegetables and fruits should be included in the diet daily to provide vitamin A needs.

2. **Minerals**

As mentioned in the previous lesson, iron deficiency is the most common nutrient deficiency among children in the United States. The prevalence of iron deficiency is about one out of every 15 children ages 3 and 10 years. The high iron needs of growth along with low iron intakes cause many children to have marginal iron status. Children should be encouraged to eat a variety of foods that are good sources of iron such as meats, eggs, legumes, enriched breads/cereals and dark green leafy vegetables.

Calcium may also be inadequate especially if the recommended three servings of milk, cheeses and yogurt are not included in the daily diet. The use of low fat milk and dairy products is recommended.

Surveys in the United States show that zinc intakes of young children are low. Chronic, mild zinc deficiency is manifested by impaired taste sensitivity, poor appetite and depressed growth. Zinc food sources include milk, yogurt, cheeses, meat, poultry and fish.

### III. PLANNING MEALS

Families are still largely responsible for at least two meals and one after school snack if the child's school offers a school lunch program. The hectic lifestyle common to most families these days, i.e. both parents working and children involved in many activities outside the home, makes it a challenge to plan and prepare meals that are nourishing. However, parents should still be responsible for the family's meals and make certain that meals and snacks are nutritionally adequate and appetizing. With adult assistance, elementary school age children enjoy helping to plan and prepare their meals. It is important that children (as well as other family members) have a nourishing breakfast, then lunch and a good dinner. Children are usually hungry after school and will need a snack.

### IV. NUTRITION ISSUES IN THE SCHOOL AGE CHILD

A. **Other Factors Influencing Food Choices**

From infancy to childhood, parents try to establish healthy eating behaviors. However, as the child gets older, other factors influence food choices in addition to the home.
1. **Television**

Children spend more time watching television than in any other activity except sleeping. This makes television a powerful influence on children's attitudes toward foods and their requests for particular products. In addition, television viewing encourages between-meal snacking and inactivity, both of which contribute to obesity.

The American Academy of Pediatrics has recommended that televised advertising aimed at children should be eliminated. Its position paper also states, “Parents rather than children should determine what children should eat.”

2. **Peers**

Food choices are influenced more by their peers than by their family. Whether a certain food is eaten or not is largely determined by the likes and dislikes of their peer group.

3. **School Meals**

School feeding, e.g. School Breakfast and School Lunch Programs, and nutrition education programs can provide not only important nutrients but also an opportunity to learn to make healthy food choices. These feeding programs make significant contributions to the nourishment of low-income children.

4. **School Vending Machines**

Many schools have food vending machines available on school grounds. The food items available from the machines have a significant influence on foods eaten by children while they are at school. One concern is that vending machines limit the opportunity for good nutrition by competing with the school lunch offering.

B. **Attention Deficit Hyperactivity Disorder (ADHD)**

This is commonly referred to as hyperactivity. Its onset is before 7 years of age, and affects 5% to 10% of school-age children. The disorder is characterized by inattention, excess motor activity, impulsiveness, and poor tolerance for frustration.

In controlled studies, both additives and sugar have not been found to play a role in causing hyperactivity. ADHD is usually controlled by using stimulant medications. Anorexia (loss of appetite) is an undesirable side effect of these medications. Efforts should be made to give the medication with or after meals to lessen the effects of anorexia, and the child monitored for adequate growth.
V. NUTRITION EDUCATION

The elementary grade is a good time to emphasize nutrition education in the classroom. To accomplish this task, nutrition education must be taught in imaginative and stimulating ways and made meaningful to the lives of the students. The objective of nutrition education is to provide just enough nutrition information to be able to select the basic necessities of a diet for good health. The basic teaching tool is the food groups and its application to daily living.

Examples of nutrition education activities that make the subject more meaningful include:

- field trips - to a dairy, cannery or freezing plant, flour mill or cereal manufacturer, bread bakery, egg ranch, fish hatchery, etc.
- make cottage cheese or ice cream in the classroom,
- grow produce in a small garden on school grounds,
- bake bread, cook a recipe,
- keep a record of their individual food intake,
- study eating habits of various ethnic groups and have students prepare ethnic recipes in class, and
- integrate nutrition and food-related experiences in other subjects.
ACTIVITY IV-2  Nutrition Education

GROUP ACTIVITY:

You will be teaching nutrition to 4th graders. The class has already learned about the MyPyramid. Plan a fun nutrition education activity to reinforce and stimulate the students' interest in healthy food choices. (Use however much class time you need for the nutrition education activity.)

Nutrition Education Activity Plan:

1. Objective:

2. Describe the activity to teach the objective:
Lesson IV-3

NUTRITION & ASSESSMENT DURING CHILDHOOD
Nutrition During Adolescence: Nutritional Needs of Children Ages 10 to 18 Years

OBJECTIVES:

In this lesson, the student will:

1. Describe the growth and development patterns of children ages 10 to 18 years.
2. Discuss nutrient needs and their rationale.
3. Identify typical dietary practices of adolescents and their nutritional implications.
4. Identify nutrients at risk in the diets of adolescent males and females.
5. Discuss ways to improve dietary practices of adolescents.
6. Discuss how common nutrition-related problems in adolescence affect nutritional needs.

ASSIGNMENTS:

Adolescence is the period from the time sex hormones are secreted, secondary sex characteristics develop and sexual maturity is completed until physical growth stops. It is a period of significant change not only physically but also psychologically. The dramatic physical growth that occurs during these years dictates changes in nutritional needs after the period of slow growth in the pre-adolescent years.

I. GROWTH AND DEVELOPMENT PATTERNS

Adolescent growth is accomplished through predictable stages involving three components: (1) sexual maturity, (2) increase in height and weight and (3) changes in body composition.

A. Sexual Maturity

Secondary sexual characteristics start to develop between the ages of 8 and 13 years in girls (development of breasts and growth of pubic hair), and between 9.5 and 13.5 years in boys (enlargement of genitalia and growth of pubic hair). The onset of menarche (or menses) in females and the completion of the growth of the genitalia in males marks the last stage in sexual maturation or attainment of adulthood.
B. Height and Weight

Growth in height and weight occurs in the 5 to 7 years of pubertal development. The periods when growth is most rapid is referred to as *adolescent growth spurts*, and the highest point referred to as the peak. The timing and intensity of growth spurts vary with each individual and with each sex.

In general, the average girl will begin her growth spurt at 11 years, peak at 12 years and finish growth by age 17 years. The average boy will begin his growth spurt at about 13 years, reach peak at 14 years and finish growth by about 18 years. Again, it should be noted that there are wide individual differences in growth patterns in both boys and girls.

C. Body Composition

Up until the onset of puberty, the proportion of fat and muscle tends to be similar in boys and girls. During puberty, changes in body composition occur resulting in girls developing 1½ to 2 times as much body fat as boys so that the adult female has about 23% body fat and the adult male has about 12%; boys gain twice as much muscle or lean body mass as girls. This significant difference influences nutritional needs.

II. NUTRIENT NEEDS

The need for energy and nutrients is greatest during the peak of the growth spurt. If calories or nutrients are inadequate at this time, growth may be inhibited.

A. Energy

Calorie needs will vary according to the current rate of growth, body size and level of physical activity. On the average, boys require 41 to 60 kcalories per kilogram per day, and girls require 38 to 48 kcalories per kilogram per day. Boys' calorie needs may be especially high since they grow a lot faster and develop more lean body mass than girls. The calorie needs of girls increase earlier because of their earlier growth spurt, but need a lot less because they reach lower body weights. Because of this, adolescent girls need to carefully select foods high in nutrient density in order to meet their nutrient needs without exceeding their calorie needs.

B. Protein

Protein needs range from 0.8 to 1.0 gram per kilogram body weight for both boys and girls or a total of 44 to 59 grams per day. In the U.S., the usual intake far exceeds the recommended amount. It is important that adequate calories are ingested to insure that protein is utilized for building lean muscle mass and nitrogen stores.
C. Iron

As it was in childhood, iron status continues to be of concern during adolescence when iron needs are also high. During periods of growth, the need for iron increases to support the synthesis of hemoglobin (for increase in blood volume) and of myoglobin (for the increase in muscle mass). Additionally, females need additional iron to replace losses from menstruation.

Starting in adolescence, the RDA for iron differs for males and females, i.e. 12 mg/day for males and 15 mg/day for females. The iron need for females remains at this level throughout their reproductive years; for males, the values return to pre-adolescent values in adulthood. Adolescent females are particularly at risk of iron deficiency since they typically consume less iron-rich meat and fewer total kcalories than males.

D. Calcium

Calcium needs are highest during adolescence to support bone growth. Forty-five percent of total bone growth occurs during this period. Inadequacy of calcium during this crucial period will impair the attainment of maximum bone mass.

Recommended Adequate Intakes (AI) for both adolescent males and females is 1300 mg./day. Calcium absorption is high during this time and milk and other dairy products are the best sources of calcium. Once again, adolescent females are at greatest risk of low calcium intake so they must be encouraged to include rich sources in their meals or snacks.

E. Vitamins

Adolescents need increased amounts of thiamin, riboflavin, and niacin due to the increased energy requirements. Adolescents, just like adults, can get all the nutrients they need from foods and no general recommendations are made for the use of supplements. However, if a supplement is used, guidelines include choosing a multiple vitamin-mineral preparation that provides nutrients at RDA levels, and avoid single-nutrient supplements.

III. TYPICAL DIETARY PRACTICES

There is no "typical" eating pattern for teenagers. The best description of their eating pattern is irregular or erratic. Teenagers come and go as they please and eat what they want when they have time. Some of the common dietary practices and their nutritional implications include:
A. Skipping Breakfast

There are different reasons why teenagers skip breakfast: lack of time, boredom with usual breakfast menus, or as a weight control measure, especially in girls.

The results of extensive surveys showed that teenagers who omitted breakfast had lower total nutrient and calorie intakes for the whole day and did not compensate for the lower intakes at other meals/snacks eaten. The breakfast eaters not only consumed more calories but also made better food selections throughout the day.

B. Snacking

Snacking is a part of the teenager's lifestyle. Snacks contribute at least 1/4 of the average teenager's daily calorie intake but often are lacking in calcium, iron, vitamin A and folate. The Ten-State Nutrition Survey showed that inadequate levels of calcium and iron were the most common dietary problems in teenagers who snacked.

Teenagers should not feel they need to give up snacking in order to be well nourished. What is important is to choose snack foods wisely, focusing on snacks that are nutrient-dense and those that provide nutrients that may be missing in meals.

C. Irregular Meals and Meals Away from Home

As teenagers become more independent, meals eaten away from home increase. These meals include lunch (usually eaten at school) and meals eaten at a friend's home, or at a fast-food or other type of restaurant. These meals can contribute significantly to the daily calorie and nutrient intake depending on the types of food selected.

Students who ate lunches either brought from home or purchased from the school cafeteria fared well nutritionally, especially in protein, vitamins and minerals.

Fast foods can also contribute to many teenagers' food intake. The major drawbacks of fast-food meals are their high calorie, high fat and high sodium content. However, there are lower calorie menu items available, so the key is selecting these items.

To summarize, the nutritional limitations of fast-food meals include:

- calcium, riboflavin, vitamin A. Inadequate unless milk or a milkshake is ordered.
- folate, fiber. Very limited sources of these are offered.
- sodium. Content is high.
- fat makes up a large part of kcalories.
• calories. In most meal combinations, kcalories exceed the amounts of nutrients provided.

D. Vegetarian Diets

Occasionally, some teenagers will follow a special diet such as a vegetarian diet. This practice can range from omitting red meats to completely eliminating animal products from the diet. (NOTE: The group presentation on vegetarian diets will discuss the various forms of vegetarian diets as well as their nutritional implications in greater detail.)

Vegetarian diets can be adequate nutritionally if properly planned. A few guidelines that can be used in planning are to:

• include milk, cheese or eggs daily to provide adequate levels of amino acids and vitamin B12,
• include a variety of plant protein sources such as legumes, seeds, cereals, nuts, and vegetables,
• select adequate sources of iron, such as baked beans, dried fruits, greens, enriched breads and cereals, and
• keep track of weight to avoid undesirable loss of weight.

E. Other Factors Influencing Dietary Practices

1. Influence of Peers
Teenagers have a desire to conform and be accepted by their peer group. As such, many of their health and food choices are influenced by the opinions and actions of their peers.

2. Growing Independence
During this period, teenagers strive to be independent. One of the ways they manifest this is through food selection and preparation. Some teenagers eat whatever and whenever they choose while other choose foods that they have regularly eaten before their teen years. In order to make wise choices, teenagers require some knowledge of practical nutrition.

3. Media Advertising
The influence of mass media advertising on food choices is significant since teenagers are vulnerable to these kinds of messages. Adolescents in the U.S. have already been influenced by 10 years of television food commercials during their childhood.

4. Availability of Ready-to-Eat Foods
Prepared foods are readily available to the teenager from vending machines, at movies, sporting events, fast food establishments and grocery stores. Unfortunately, most of the choices offered at these places are loaded with kcalories, fat and sodium and low on essential nutrients.
IV. NUTRIENTS AT RISK

Nutrients that are frequently reported as inadequate in nutrient intake studies of teenagers include iron, calcium, zinc, vitamins A, D, B6 and folate. Males usually meet the RDA for all nutrients except iron largely due to greater amounts of food eaten. On the other hand, females, because of their lower food intake and their concern with slimness, more frequently have inadequacies in the nutrients mentioned earlier.

V. IMPROVING DIETARY PRACTICES

Teenagers value their independence and any attempts to improve their dietary practices must take this into account. Nutrition counselors need skill in appropriate methods of communicating with them as well as knowledge of their physical and psychological development, lifestyles and habits. Parents must be supportive and be involved in the counseling process.

The following are suggestions to improve common dietary practices:

• On skipping breakfasts: use creativity in the breakfast menu with emphasis on foods high in nutrients like fruits/fruit juices, nonfat milk, whole grain cereals, etc.
• On snacking: choose snack foods wisely. Snacks need to provide nutrients, not only calories, snacks that provide the nutrients lacking in foods eaten at meals are excellent choices. For example, yogurt, cheese, or milk as sources of calcium; bran muffins, hard-boiled eggs or crackers with peanut butter for extra iron; apricot, peaches, carrots, cheese or milk for vitamin A.
• On fast-foods: vary menu selections, select lower calorie menu items, eliminate high calorie toppings like mayonnaise; compensate for missing nutrients by eating a large salad, several fruits and dark green vegetables at other meals or snacks.
• On vegetarian diets: encourage to plan vegetarian diets with a registered dietitian to insure adequacy; include milk and eggs.

Since many teenagers are very independent, the best approach in improving their dietary practices is to give them the nutrition knowledge needed to plan their own diets rather than being reminded to eat what is nourishing. Nutrition education in schools is most effective if started in grade school and continued in junior and senior high school programs. Every opportunity should be taken by the parents to reinforce and support what is learned.

A factor that usually motivates teenagers to improve their eating habits is their concern with personal appearance. The key is showing the relationship between a pleasing physical appearance and good nutrition.
VI.  NUTRITION-RELATED CONCERNS DURING ADOLESCENCE

A. Teenage Pregnancy

1. Health Implications

Teenage pregnancy continues to be a major problem in the United States. Teenage pregnancy is considered a high risk pregnancy both in terms of the mother's and infant's health. The greatest risks are in those who become pregnant before reaching physiological maturity (about four years after onset of menstruation). During this period, the demands of pregnancy compete with those of maternal growth.

Risks to the mother include:

- more complications like bleeding, anemia, infections, preeclampsia and eclampsia,
- difficult labor and delivery, and
- higher risk of maternal mortality.

Additionally, there are also the problems in psychological development, continuation of schooling, and social and economic problems.

Risks to the infant include:

- low birth weight (the major risk in teenage pregnancy),
- prematurity,
- physical deformities,
- stillbirth, and
- prenatal and infant mortality.

2. Nutrient Needs

There is not much specific information available on the calorie and nutrient needs of the pregnant teenager. For calories and some nutrients, estimated allowance is made by adding the additional amounts needed by the pregnant adult woman to the RDA for females ages 15 to 18 years. Exceptions are vitamin D, calcium, phosphorus and fluoride, which do not change with pregnancy or lactation.

A suggested way of insuring adequacy of nutrient intake is to encourage the pregnant teenager to gain the recommended amount of weight by eating nutrient-rich foods. Rich sources of iron, calcium, vitamin A, folic acid, protein and dietary fiber should be emphasized since these are most limiting in their diets.
3. Support and Counseling Needs

Pregnant teenagers often present a variety of social and economic problems and need assistance and/or referral to prenatal care, nutrition guidance, financial aid, emotional support and continued schooling.

The federal Woman, Infants and Children (WIC) Program provides nutrition supplementation and education to eligible pregnant women including teenagers. Participation of pregnant teenagers in the WIC Program has greatly reduced low-birth weight infants.

In counseling the pregnant teenager, it is very important to establish rapport. The counselor should always be empathetic and supportive. The prenatal period is a great opportunity to present sound nutritional information since the teenager will most likely be receptive. As she learns more about the physiologic needs of her body and of her developing infant, and as she keeps track of her weight gain, the pregnant teenager becomes more motivated to improve her nutritional health.

B. Eating Disorders

1. Anorexia Nervosa

a. Definition: A severe eating disorder, usually seen in girls and young women, in which the person is psychologically unable to eat and refuses food, becoming extremely emaciated.

b. Symptoms: A combination of symptoms are characteristic of anorexia nervosa. These have been defined by the American Psychiatric Association (APA) to include:

- refusal to maintain body weight over the minimum considered normal for age and height; loss or failure to gain with maintenance of 15% below expected weight,
- pathological fear of gaining weight though underweight,
- disturbed perception of body weight, size or shape, e.g. feels fat or that body parts are fat, though severely underweight, and
- absence of three consecutive menstrual cycles (amenorrhea).

c. Incidence: Majority of cases occur in adolescent females-about 10% of young women are estimated to be affected. Males make up about 5 to 10% of anorectic teenagers. The anorectic teenager usually comes from a middle or upper-class family, and considered as a model child until she develops a compulsion about her weight.

d. Treatment: Intervention strategies include early recognition of symptoms, individual and family psychotherapy and nutritional support.
If the nutrition assistant suspects anorexia nervosa, the client should be immediately referred to the registered dietitian for further assessment. The following initial nutrition screening can be performed by the nutrition assistant:

- growth data including frame size, weight, height, weight for height, ideal body weight and percent ideal body weight,
- body composition data like triceps skinfold measurements,
- energy data - basal energy expenditure (BEE) for ideal body weight, and
- biochemical data using laboratory test results with nutritional implications, i.e. electrolytes, calcium, phosphorus, urine specific gravity, etc.


2. **Bulimia Nervosa or Bulimia**

a. **Definition:** An eating disorder, seen largely in girls and young women, marked by alternate gorging of large amounts of food followed by self-induced vomiting or purging with laxatives; in contrast to anorexia nervosa, weight is usually maintained at close to normal.

b. **Symptoms:** The criteria for diagnosis established by the APA include:

- recurrent episodes of binge eating, rapid consumption of large amounts of food (average binge takes about an hour and about 3400 kcalories is consumed),
- lack of control over binges,
- regular self-induced vomiting, use of laxatives or diuretics, strict dieting or fasting, or vigorous exercise,
- average of two binge-eating episodes a week for at least 3 months, and
- over concern with body shape and weight.

c. **Incidence:** Affects mostly girls and young women; age of onset is often later than anorexia nervosa. The disorder sometimes develops after a bout with anorexia nervosa or severe dieting in obesity. People with bulimia hide their problem well and therefore, are difficult to identify.

d. **Treatment:** Treatment strategies are similar to those in anorexia nervosa and involve psychotherapy and nutritional therapy. The nutrition assistant should refer suspected bulimia nervosa to the registered dietitian for further assessment.
C. OVERWEIGHT AND OBESITY

1. Definitions

a. Overweight - actual weight is 10 to 20% above normal weight-height midranges in weight-for-height tables; or above the recommended Body Mass Index (BMI) values for adolescents (Appendix D-9).

b. Obese - actual weight is 20% or more above normal weight-height midrange with a high degree of fatness; for BMI values refer to Appendix D-9.

2. Factors That Cause Excess Weight

Although there are many specific factors that contribute to excessive weight, the ultimate cause is excess of calorie intake in relation to the body's energy expenditure. Factors leading to obesity can be divided into two:

a. Psychological Factors
   • Parents' use of food as a reward for their children encourages the use of food for psychological support.
   • Use of food as a comfortable form of security for some children who rely on food to deal with the insecurities they may feel within their families.
   • Food offers psychological comfort in times of stress to some children as well as adults. Some children experience weight problems during stressful developmental periods such as entry to school (around age 5 or 6), beginning of puberty, middle teens, etc.
   • Being overweight may be a defense mechanism for some teenagers wishing to avoid contacts with the opposite sex.

b. Physiologic Factors
   • Overabundance of food and lack of physical activity in today's society.
   • Certain individuals may have set-point weights, i.e. a high body weight may be physiologically normal for that person and his/her body defends to keep it that way.
   • Lower basal energy need in some individuals, i.e. a decreased requirement for the amount of energy used in basal metabolism.
3. Prevention and Treatment

Prevention through weight control before extra weight becomes a problem is the best approach. An effective way is to encourage physical activities such as sports, walking, etc. and limit the time spent sitting and watching television. Parents should learn to recognize cues to satiety and hunger, especially in infants and young children. Nutrition education for parents should include nutritional needs of the young and emphasize the need to develop family attitudes that will help in maintaining appropriate weight.

The best method to use when a child is gaining too much weight is to provide a diet that maintains weight, not cause any weight gain, and allow the child's height to catch up with the weight.

The nutrition assistant should refer overweight clients to the registered dietitian for further assessment.

D. SUBSTANCE USE AND ABUSE

Substance abuse by adolescents is a major public health problem. Some of the substances abused by teenagers include tobacco, alcohol, marijuana and cocaine. The effect(s) of substance abuse on nutritional status depends on the substance, the amount, length and frequency of use, prior health and nutritional status, stage of physical growth, and nutritional adequacy of the diet consumed.

Nutrition Problems of Substance Abusers:*  

- spend money for drugs instead of food,  
- lose interest in food during "highs",  
- some drugs depress appetite,  
- lifestyle fails to promote healthy eating practices,  
- medications used to treat dependency may impair their nutritional status, and  
- may contract AIDS, hepatitis, or other infectious disease which increase nutrient needs and/or depress appetite.

Lesson IV-4

NUTRITION & ASSESSMENT DURING CHILDHOOD
Nutrition Screening: Children 2 to 18 Years

OBJECTIVES:

In this lesson, the student will:

1. Describe parameters used in the nutrition screening of children ages 2 to 18 years.
2. Describe and practice correct techniques in obtaining weight and height measurements.
3. Calculate child’s age to use in plotting measurements on growth charts.
4. Practice plotting measurements on appropriate growth charts and interpret values.
5. Identify factors in a child’s health/social history and observable signs that may indicate nutritional risk.
6. Practice using the food frequency questionnaire to screen usual intake for adequacy.

ASSIGNMENTS:

MATERIALS: Activity work sheets (2)
Handouts: Child Nutrition Questionnaire, DHS-WIC Program.
WIC Nutritional Need Indicators: Infants & Children.
Guidelines in Planning Care After Screening.
Daily Food Guide: 1 to 3 Years
Daily Food Guide: 4 to 5 Years

I. ANTHROPOMETRIC DATA FOR SCREENING

Height and weight measurements are used to screen for adequate growth in children. Height is an indication of bone growth while weight indicates the total weight of bone, muscle and fat. Plotting weight for height is a measure of body mass.

Children two years of age and older and who are at least 35 inches (89 cm) tall are measured standing in stocking feet and wearing light clothing. These measurements are then plotted on the NCHS Growth Charts 2 to 18 years for boys or girls.
A. EVALUATION OF GROWTH USING GROWTH CHARTS
Evaluation of growth using growth charts is considered the most useful nutrition assessment tool for children. If the growth is not following a normal pattern, additional assessment parameters should be collected.

1. Calculating Age for Plotting
In plotting measurements on growth charts, the child’s age when the measurements are taken must first be determined. The child’s age must be rounded to the nearest 1/4 year, i.e., every 3 months equals 1/4 year. The standard method for rounding off is:

<table>
<thead>
<tr>
<th>Number of Days/Mo.</th>
<th>Round To:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 15 days</td>
<td>Previous month</td>
</tr>
<tr>
<td>16 - 31 days</td>
<td>Next month</td>
</tr>
<tr>
<td>0 - 1 month</td>
<td>Previous whole year</td>
</tr>
<tr>
<td>3 ± 1 months</td>
<td>1/4 year</td>
</tr>
<tr>
<td>6 ± 1 months</td>
<td>1/2 year</td>
</tr>
<tr>
<td>9 ± 1 months</td>
<td>3/4 year</td>
</tr>
<tr>
<td>11 - 12 months</td>
<td>Next whole year</td>
</tr>
</tbody>
</table>

The method for calculating is:

a. Write down the date when measurements are taken in year, month and day.
b. Write down the child’s date of birth in year, month and day. Then subtract from a.
c. If numbers cannot be subtracted, borrow 12 months from the year column and borrow 30 days from the month column.

Sample calculations:

(1) B.T.’s date of measurement is July 20, 1997. Her date of birth is April 3, 1994. What age should be used to plot her measurements?

<table>
<thead>
<tr>
<th>Calculation:</th>
<th>Year</th>
<th>Month</th>
<th>Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of Measurement</td>
<td>1997</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Date of Birth</td>
<td>-1994</td>
<td>-4</td>
<td>-3</td>
</tr>
<tr>
<td>Child’s Age</td>
<td>3</td>
<td>3</td>
<td>17</td>
</tr>
</tbody>
</table>

= 3 years, 4 mos.  = 3½ years

(2) M.C.’s date of measurement is May 7, 1996. His date of birth is December 10, 1993. What age should be used to plot his measurements?
2. **Plotting Measurements on Growth Charts**

Measurements of children at least 35 inches tall and taken in the standing position are plotted on NCHS Growth Charts ages 2 to 18 years. These charts are sex specific and provide percentile curves for body weight for age, stature (or height) for age, and weight for stature. Children who measure less than 35 inches, or who cannot be measured in the standing position, should be measured using recumbent length and plotted on the charts for birth to 36 months.

The same measurement unit (i.e., U.S. system or metric) should be used each time. If measurements are taken in inches and pounds use the corresponding lines, not the lines for centimeters and kilograms.

3. **Interpreting Plotted Values**

Plotting a child’s measurement on growth charts is comparing the child’s measurements with those obtained from large scale studies of infants and children from a cross-section of the U.S. population of comparable age and sex. Plotting of measurements at a single age only gives information on the relationship of weight to height compared with other children of the same age and sex. On the other hand, repeated measurements plotted on a growth chart at different ages in the same child allow one to visualize the child’s growth pattern in comparison with that of other healthy children.

In interpreting growth curves, it should be recognized that these do not always proceed in a smooth curve. However, in general, a child will grow along approximately within the same percentile track. If there is a substantial change in percentiles, i.e., cross two percentile lines or a definite downward or upward change over time, the nutritional or clinical reasons for the change should be investigated.
**Guidelines for Interpretation**

**Underweight:**
- Weight for height at the 5th percentile or below, or
- Present weight for height dropped a percentile or more from previous measurements.

*Implications:* The child may be at risk for underweight or failure to thrive, likely due to deficient calories.

**Overweight:**
- Weight for height at the 95th percentile or above, or
- Present weight for height has moved to higher percentiles over time compared to previous measurements.

*Implications:* The child may be at risk for overweight/obesity, likely due to excessive calories and/or decreased physical activity.

**Short Stature:**
- Stature (or height) for age at the 5th percentile or lower, or
- Present stature for age dropped percentiles over time from previous measurements.

*Implications:* The child may be at risk for short stature or failure to thrive, likely due to inadequate protein intake and/or long-term malnutrition.

If nutrition screening shows any of the above conditions, the nutrition assistant should refer the child to the R. D./nutritionist for further assessment.

To evaluate weight status from ages 10 through 19 years, measures of body mass index (BMI) may also be used. (Appendix D-9/handout)

**II. BIOCHEMICAL DATA FOR SCREENING**

Iron deficiency anemia is the most common single nutrient deficiency in the U.S., including children 2 to 18 years of age. Two simple and inexpensive blood tests are used to screen for anemia: hemoglobin and hematocrit tests.

Normal values for hemoglobin and hematocrit are age-specific and affected by altitude.
Any child with values falling in the high risk criteria (refer to handout/Appendix F-2 WIC Nutritional Need Indicators: Infants/Children) should be referred to R.D./nutritionist for further assessment.

III. CLINICAL DATA FOR SCREENING

Clinical data for screening includes: (1) health and social history, (2) observation of physical appearance, and (3) oral screen.

A. Health and Social History

The following information must be obtained and evaluated:

- Birth weight, including number of weeks premature, if applicable,
- Nutrition concerns and/or eating problems,
- Programs or support services received,
- Presence of condition(s) that may affect nutritional status (refer to Lesson I-1, page 2 for a list of conditions),
- Any medical diagnosis that may affect nutritional status.

B. Observation of Physical Appearance

The physical appearance and behavior of a child can give clue(s) as to the child’s general nutritional health. (Read Table 16-3, page 398 in the textbook.)

Pay special attention to the following:

- Weight and size compared with children of same age and sex,
- Normal amount of energy for a child,
- Level of interest and alertness,
- Signs of illness like runny nose, sneezing, cough, etc.,
- Presence of missing or decayed teeth, and
- Appearance of over-tiredness, e.g., lack of energy, paleness, dark circles around the eyes, etc.

C. Oral Screening

Oral screening involves inspecting the mouth, gums, and teeth for signs of dental problems like dental caries. Signs of dental problems to look for include:

- Black or brown spots on the teeth and/or visible holes,
- Crooked teeth, over- or under-bite, teeth growing in unusual places, extra or missing teeth,
- Discolored or stained teeth,
- Swollen or bleeding gums, and
- Sores and redness in or around the mouth.
IV. DIETARY DATA FOR SCREENING

Dietary screening data may reveal possible nutrient inadequacies of usual food intake. The commonly used tool is the food frequency questionnaire. (See example in Form 12-3, pages 312-313 in the textbook).

The food frequency questionnaire or checklist assesses the quality of food intake by determining how frequently the individual consumes foods listed that are major sources of nutrients. Foods are listed as food groups, with each food in the group contributing similar nutrients. One food grouping useful for screening is MyPyramid.

If the child’s usual intake omits or rarely includes foods from one food group, the intake may be low in major nutrients contributed by that food group.

Dietary screening also includes evaluation of feeding skills as well as eating behavior. Screening guidelines for these include the following:

Feeding Skills
Development of age-appropriate feeding skills should be screened.

2 Years: At two years of age, a child is normally able to use an overhand grasp to fill a spoon and eat without spilling. The child also starts to use a fork and drinks from a cup without dribbling.

3 Years: By three years, the child combines finger feeding and eating with a spoon and fork. S/he is able to drink with a straw.

4 Years: At four years, the child feeds self well, spills little, and pours from a pitcher.

5 Years: By five years, the child cuts with a knife. Feeding skills are refined and the child is independent.

Eating Behavior
Screening for eating behaviors will include such information as:

- whether or not the child drinks from a bottle
- whether the child eats dirt, clay, paint chips, ice, refrigerator frost, cornstarch, laundry starch, paste, chalk, or pencil lead
- whether the child frequently has diarrhea or constipation
- whether the child eats breakfast almost every day
- whether the child eats lunch almost every day
- whether the child snacks all day long instead of eating regular meals
- whether the child is a picky eater
- whether the child is a vegetarian
- whether the child uses excessive sweetened beverages
- whether the child lives in a home without a working stove or refrigerator or running water
- whether the child is allergic to any foods
- whether the child takes vitamin/mineral supplements
### TABLE IV-4.1: GUIDELINES IN PLANNING CARE AFTER SCREENING

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>CRITERIA</th>
<th>CARE PLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate food intake</td>
<td>1) Inadequate in one food group.</td>
<td>1) Counsel at time of assessment.</td>
</tr>
<tr>
<td></td>
<td>2) Inadequate in two or more food groups.</td>
<td>2) Refer to R.D./nutritionist.</td>
</tr>
<tr>
<td>Overweight for height</td>
<td>1) Weight/height at 75th to 94th percentile.</td>
<td>1) Counsel on food choices, activity to control weight. Monitor on return visits.</td>
</tr>
<tr>
<td></td>
<td>2) Greater than the 95th percentile.</td>
<td>2) Refer to R.D./nutritionist.</td>
</tr>
<tr>
<td>Underweight for height</td>
<td>Less than the 5th percentile in weight/height.</td>
<td>Refer to R.D./nutritionist.</td>
</tr>
<tr>
<td>Delayed growth</td>
<td>Less than the 5th percentile in height for age.</td>
<td>Refer to R.D./nutritionist.</td>
</tr>
<tr>
<td>Inappropriate growth pattern</td>
<td>No improvement from previous decrease of two percentile curves in any NCHS growth chart.</td>
<td>Refer to R.D./nutritionist.</td>
</tr>
<tr>
<td>Anemia</td>
<td>1) Hgb&lt;11 gm/dl or Hct &lt;33%</td>
<td>1) Counsel to increase intake of iron-rich foods with vitamin C-rich foods.</td>
</tr>
<tr>
<td></td>
<td>2) Hgb ≤ 10 gm/dl or Hct ≤ 30%</td>
<td>2) Refer to R.D./nutritionist and/or physician.</td>
</tr>
<tr>
<td>Food allergies or intolerances</td>
<td>Seriously compromise adequacy of diet.</td>
<td>Refer to R.D./nutritionist and/or allergist.</td>
</tr>
<tr>
<td>Unusual dietary practices</td>
<td>Vegan, macrobiotic diet.</td>
<td>Refer to R.D./nutritionist.</td>
</tr>
<tr>
<td>Dental caries</td>
<td></td>
<td>Counsel to decrease cariogenic foods/practices; refer to dentist.</td>
</tr>
</tbody>
</table>

A.D. is a female client who came for a check-up on September 12, 1996. Her record shows a birth date of November 26, 1993. Measurements taken at this check-up were:

- Height (stature): 36½ inches
- Weight: 32 pounds

1. Calculate A.D.’s age to use in plotting.

2. Plot A.D.’s measurements on the following charts (Handout/Appendix D) and write percentiles here.

<table>
<thead>
<tr>
<th>Growth Chart</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Stature for age</td>
<td></td>
</tr>
<tr>
<td>(b) Weight for age</td>
<td></td>
</tr>
<tr>
<td>(c) Weight for stature</td>
<td></td>
</tr>
</tbody>
</table>

3. What is your interpretation of these percentile values for A.D.?
ANSWERS TO ACTIVITY IV-4A

1. A.D.'s age calculation:

<table>
<thead>
<tr>
<th>Date of Measurement</th>
<th>Year</th>
<th>Month</th>
<th>Day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1995</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1996</td>
<td>9 + 12</td>
<td>12 + 30</td>
</tr>
<tr>
<td>Date of Birth</td>
<td>- 1993</td>
<td>- 11</td>
<td>- 26</td>
</tr>
<tr>
<td>Child's Age</td>
<td>2</td>
<td>9</td>
<td>16</td>
</tr>
</tbody>
</table>

Child's Age = 2 years, 10 mos. = 2 ¾ years

2. (a) Stature for age 50th percentile
   (b) Weight for age Between the 50th and 75th percentiles
   (c) Weight for stature 75th percentile

3. All percentile values are within natural limits.
ACTIVITY IV-4B - FOOD FREQUENCY QUESTIONNAIRE

A.D.’s (client in previous activity) mother completed the food frequency questionnaire about A.D.’s usual food intake as follows:

- Milk and milk products  <3 times/day
  (milk, cheese, yogurt, ice cream, etc.)
- Protein foods  3 times/day
  (meat, fish, poultry, beans, peanut butter, etc.)
- Breads, grains, cereals  7 times/day
  (cereal, bread, tortilla, crackers, rice, noodles, etc.)
- Fruits/Vegetables (Vitamin C)  1 time/day
  (orange/ grapefruit, strawberries, broccoli, etc.)
- Fruits/Vegetables (Vitamin A)  <1 time/day
  (apricots, carrots, dark leafy greens, sweet potatoes, etc.)
- Other Fruits/Vegetables  1 time/day
  (apples, bananas, potatoes, peas, corn, lettuce, etc.)
- Fats, oils and sweets  3 times/day
  (chips, cakes, cookies, jello, soda, Kool-aid, etc.)

1. Compare A.D.’s usual intake with amounts recommended in the “Daily Food Guide for Children”, ages 1 to 3 years (handout).

2. Evaluate for nutritional adequacy by indicating
   (a) food groups that are inadequate or in excess,
   (b) major nutrient that may be inadequate or excessive. (Use pages 14-15 in the textbook as guide).
ANSWERS TO ACTIVITY IV-4B

1. **Recommended Amounts Not Met**
   - Milk and milk products
   - Fruits and vegetables (Vitamin A)
   - Other fruits and vegetables

   **Major Nutrient Inadequacy**
   - Protein, calcium, riboflavin
   - Vitamin A, fiber
   - Fiber, vitamins A and C

2. **Excessive Amounts**
   - Fats, oils and sweets

   **High in sugar, fat, salt.**

2. **Evaluation:**

   A.D.’s mother needs counseling on improving A.D.’s diet by adding a serving or more of milk/milk products, and at least two more servings of fruits and vegetables, especially rich sources of vitamin A. Just as important is for A.D. to decrease the amount of sweets and fats/oils to occasional treats. These foods provide empty calories. Suggest to the mother that milk/milk products, fruits and vegetables be offered as snack foods instead.
OBJECTIVES:

In this lesson, the student will:

1. Review the following: (a) Dietary Guidelines for Americans, (b) diet-planning principles, and (c) diet-planning guides.
2. Discuss lifestyle factors that promote health.
3. Enumerate guidelines for changing behaviors successfully.
4. Discuss risk factors and measures recommended to prevent major health problems in adults.

ASSIGNMENTS:

MATERIALS:  
Handouts:  *Health Risk Appraisal* form  
Activity Work Sheet (1)  
Assignment (1)

I. PLANNING A HEALTHY DIET

Good nutrition is one of the factors that contribute to good health. A healthy diet does not depend on the selection of one particular food but on the selection of a variety of different foods in the meals eaten everyday over the months and years. The major concepts that should be used in food selection include the diet-planning principles, the diet-planning guides, and the dietary guidelines.

A. Dietary Guidelines for Americans, 2005

B. Diet-Planning Principles
There are six basic diet-planning principles:
• adequacy
• balance
• kcalorie or energy control
• nutrient density
• moderation
• variety

C. Diet-Planning Guides
To plan a diet that meets the diet-planning principles outlined above, one needs guides in addition to knowledge. Two of the most commonly used guides in diet planning are the food group plans (or food guides) and the exchange lists.

1. MyPyramid Food Guidance System
The food group plans organize foods of similar origin and nutrient content into groups and specify the recommended number of servings that should be eaten from each group. These guides help to achieve dietary adequacy, balance, and variety.

MyPyramid includes six food groups:
• Breads, cereals and other grain products
• Vegetables
• Fruits
• Milk, cheese, and yogurt
• Meat, poultry, fish and alternates
• Fats and oils

2. Exchange Lists
The exchange lists organize foods by their proportions of carbohydrate, fat, and protein. Foods on any single list contain the same amount of these nutrients and kcalories, and therefore, can be used interchangeably. The exchange list is useful in planning diets needing kcalorie control.

An exchange system:
• names the foods on each list,
• specifies portion sizes, and
• states the amounts of carbohydrate, protein, fat and kcalories of each exchange portion.

The exchange system includes the following lists:
• Starch
• Fruit
• Milk
• Other Carbohydrates
• Vegetables
• Meat and Meat Substitutes
• Fat
• Combination Foods
• Free Foods
II. COMPONENTS OF A HEALTHY LIFESTYLE

Several lifestyle behaviors influence long-term health. These behaviors include:

- dietary habits,
- exercise patterns and fitness activities,
- stress management, and
- freedom from use of tobacco, alcohol, and drugs.

A. Dietary Habits

The Dietary Guidelines and the Food Guide Pyramid serve as guides on what to eat to stay healthy.

B. Exercise Patterns and Fitness Activities

1. Benefits of regular exercise. Regular exercise contributes many health benefits including the following:
   - helps maintain energy balance and control weight,
   - strengthens muscles and helps prevent age-related loss of lean body mass and increase in body fat,
   - strengthens bone by increasing bone formation and preventing bone loss,
   - increases cardiovascular efficiency and maintenance of acceptable blood pressure,
   - increases serum levels of high-density lipoproteins (HDLs) which help prevent coronary artery disease,
   - improves digestion and elimination, and
   - improves mental outlook, relieves stress and improves sleep.

2. Major types of exercise. The two major types of exercise include:
   - anaerobic exercise is usually short in duration and uses muscle glycogen rather than fat as the main source of energy. Best type to develop muscular strength and flexibility. Examples include weight lifting, calisthenics, and sprinting.
   - aerobic exercise is longer in duration and uses body fat as main energy source. This type is recommended for cardiovascular fitness, stress management, and weight control. Examples include brisk walking, running, bicycling, swimming, and cross-country skiing.

3. Starting an Exercise Program

C. Stress Management

Stress is the specific response of the body and mind to any life event that causes a change that requires adaptation. The stress response is the
same whether the event is positive (e.g. getting a new job, getting married) or negative (e.g. losing a job, death in the family).

Some of the physiologic symptoms of stress response include:
- gastrointestinal distress,
- irregular sleep patterns,
- increased muscle tension leading to headaches, backaches and,
- rapid pulse.

Long-term consequences of unmanaged stress include elevated blood pressure, gastric problems such as peptic ulcer, eating disorders, etc.

No one can totally avoid stress. However, stress becomes a danger to health if it is constant and unmanaged. What is important is to identify sources of stress, learn how to manage them and work toward constructive ways to cope with these life events.

Some ways suggested to modify stress include:
- identify the source of stress,
- stay in good physical shape,
- take time to relax,
- learn to accept things that cannot be changed,
- practice deep breathing and progressive muscle relaxation exercises daily, and
- avoid taking medications to relieve stress.

D. Addictive Behaviors Harmful to Health

1. Cigarette smoking
   The harmful effects of cigarette smoking on health include lung cancer, chronic lung disease, heart disease and stroke. In pregnancy, smoking increases the risk of low-birth weight, morbidity and mortality in the infant.

   Cigarettes not only harm the smoker, but also children and family members who are exposed to second-hand smoke. It is never too late to quit smoking. No single method works for everyone. There are various group/support programs that can help smokers quit, if the smoker cannot quit without help.

2. Alcohol abuse
   Regular heavy use of alcohol impairs nutritional status and increases risk of certain chronic diseases. The harmful effects of chronic alcohol use on health include:

   (a) Depresses appetite. Heavy drinkers usually eat poorly and develop malnutrition. Alcohol gives 7 kcalories per gram but no other nutrients.
(b) Interferes with absorption and/or metabolism of nutrients. In particular, these nutrients are the B vitamins (folate, B₆, thiamin and B₁₂), vitamin A, and zinc.

(c) Causes fetal alcohol syndrome. Alcohol use during pregnancy causes damage to the developing fetus resulting in physical and behavioral abnormalities.

(d) Increases blood pressure, blood lipids, and the risk of stroke and heart disease.

(e) Causes fatty liver, alcoholic hepatitis, and cirrhosis.

(f) Increases risk of cancer of the liver, pancreas, rectum, and breast. Increases risk of cancer of the mouth, pharynx, larynx, and esophagus if alcohol is used along with tobacco.

(g) Causes depression, anxiety and insomnia; impairs balance and memory.

(h) Causes most accidental deaths, including automobile fatalities.

Because of the many potentially devastating effects of alcohol on health, it is best to avoid alcohol. But for those who enjoy a few drinks, the Dietary Guidelines state, "If you drink alcoholic beverages, do so in moderation." If taken in moderation, alcohol can be a part of a healthy lifestyle. **Moderation in relation to alcohol is not more than two drinks a day for the average-sized man and not more than one drink for the average-sized woman.** "A drink" is any alcoholic beverage that gives ½ ounce of pure ethanol. Examples are:

- 4 to 5 ounces of wine
- 10 ounces of wine cooler
- 12 ounces of beer
- 1¼ ounces (about a jigger) of hard liquor (80 proof whiskey, scotch, rum, or vodka).

### III. GUIDELINES FOR CHANGING BEHAVIORS

Acquiring and practicing a healthy lifestyle most often involves changing undesirable behavior(s) to healthier one(s). Changing behavior is not easy and requires both time and motivation. Some individuals need additional counseling and support to acquire permanent behavior change.

### IV. CHRONIC DISEASE PREVENTION

In addition to health promotion, the focus in this century has been on the effects of diet and lifestyle on chronic diseases. Due to the life long effects of chronic diseases and their related health-care costs, the emphasis of health care professionals is to identify risk factors associated with these conditions and develop measures to modify these risk factors, particularly in individuals genetically predisposed to these conditions.
The chronic diseases that rank among the top ten leading causes of death in the U.S. and which are diet-related will be discussed here. These diseases are:
- heart disease and strokes,
- hypertension,
- cancers, and
- diabetes mellitus.

A. Heart Disease and Strokes

Diseases of the heart and blood vessels, referred to as cardiovascular disease, results in heart disease and strokes which are the first and third leading causes of death in adults in the U.S., respectively. The most common form of cardiovascular disease is coronary heart disease (CHD) which usually involves atherosclerosis and hypertension. Atherosclerosis is the accumulation of lipids and other materials in the arteries.

1. The major risk factors for CHD include:
   - High LDL cholesterol
   - Low HDL cholesterol
   - Hypertension
   - Diabetes mellitus
   - Male, 45 years or older
   - Female, 55 years or older, or with premature menopause and not on estrogen replacement therapy
   - Smoking
   - Family history of heart attacks or sudden death before age 55 in a male parent/sibling, or before age 65 in a female parent/sibling.

   The first four risk factors can be changed with diet and weight loss.

2. Recommendations for Reducing Cardiovascular Disease Risk
   (a) Blood lipid screening.

   Several blood lipids including total cholesterol, LDL cholesterol, HDL cholesterol, and triglycerides are measured to determine risk of CHD. Individuals identified as high risk after two measurements a week apart are put on a diet plan to normalize blood lipids, and drug treatment if the diet alone does not adequately lower blood lipids.

   (b) Control weight.

   Weight loss decreases heart disease risk factors, specifically, blood pressure, blood cholesterol and blood triglyceride levels.

   (c) Regular aerobic exercise.

   Regular and frequent aerobic activity is effective in lowering LDL, raising HDL, and strengthening the heart muscle. In cases where heart and artery disease are already present, a
monitored program of physical activity may actually help to reverse the disease.

(d) Reduce fat, especially saturated fat. Reduce total fat to 30% or less of total kcalories, saturated fat to less than 10% of total kcalories, and cholesterol to 300 mg per day.

(e) Other dietary interventions. Other factors in the diet have been shown to reduce risk of heart disease. These include: (1) soluble fiber (found in legumes, oats, apples, and other fruits) lowers blood cholesterol; (2) foods high in vitamins C and E--antioxidants that prevent oxidation of LDL; (3) moderate alcohol use (one to two drinks a day) raises HDL cholesterol and prevents blood clot formation.

(f) Drug treatment. If changes in the diet and physical activity fail to normalize blood lipids, drugs may also be used.

B. Hypertension

Hypertension is higher than normal blood pressure. On the average, normal blood pressure at rest for adults is 120 over 70 mm. Hg. Hypertension is blood pressure of 140 over 90 or higher. Hypertension is a major health problem in this country, affecting 1 out of every 4 Americans. About 95% of all cases of hypertension is know as "essential" or "primary" hypertension. It develops without a specific, identifiable cause.

Although hypertension usually presents no symptoms, it is a serious condition that must be treated. There is no cure but hypertension can be controlled. If left untreated, hypertension can lead to stroke, heart attack, congestive heart failure, kidney disease, and blood vessel damage.

1. The risk factors for hypertension include:
   - Age. Blood pressure increases with age due to loss of elasticity of the arteries.
   - Heredity or family history
   - Obesity. Excess body fat, especially abdominal fat.
   - Race. Incidence of hypertension is twice as much in African Americans as among whites.
   - Smoking. Nicotine increases heart rate and constricts blood vessels.
• Alcohol. Heavy alcohol use (more than two drinks a day) is associated with hypertension.
• Stress. Stress response results in constriction of blood vessels and rapid pulse.

NOTE: Salt intake is not a risk factor for developing hypertension but it may worsen existing hypertension in some individuals who are genetically "salt sensitive".

2. Recommendations for Reducing Hypertension Risk
(a) Control weight
Weight loss alone is one of the most effective non-drug treatment for hypertension. Even a weight loss of only 10 pounds significantly lowers blood pressure.

(b) Increase physical activity.
Moderate and regular physical activity helps lower blood pressure directly, independent of its role in weight control.

(c) Reduce salt (sodium) intake.
Decreasing salt/sodium in the diet can lower blood pressure in "salt sensitive" individuals. It also increases the effectiveness of antihypertensive medications.

(d) Reduce alcohol intake.
Follow same guidelines discussed earlier.

(e) Drug treatment.
Diuretics and antihypertensive agents are prescribed when diet and physical activity do not lower blood pressure. Diuretics lower blood pressure by increasing loss of fluid. Some diuretics cause increased loss of potassium, therefore, good sources of potassium must be included in the diet to replace losses.

C. Cancers

Cancer refers to the uncontrolled growth of abnormal cells which disrupts the normal functioning of the body's cells or organs. It is not a single disorder. It is the second leading cause of death in adults in the U.S.

1. Risk factors for cancer include:
• Genetic factors.
• Environmental factors, including smoking, water/air pollution, and sun exposure.
• Dietary factors. Some dietary factors are suspected as cancer initiators (carcinogenic), and others, as cancer promoters (accelerate development of the tumor). Nitrosamines and alcohol are suspected carcinogens, while dietary fat in excess may promote cancer.
• Dietary factors: antipromoters. Fruits and vegetables contain fiber, antioxidants (beta-carotene, vitamins C and E), and phytochemicals which are all linked to lower incidence of cancer.

2. Recommendations for Reducing Cancer Risk
• Control weight and prevent obesity.
• Decrease total fat intake to 30% or less of total kcalories.
• Increase dietary fiber intake to 25-38 grams per day for adults 50 years & younger; 21-30 grams per day for adults over 50.
• Include at least five servings of fruits and vegetables daily.
• Limit or avoid consumption of salt-cured, salt-pickled, and smoked foods.
• If you drink, do so in moderation.

D. Diabetes Mellitus

Diabetes mellitus ranks seventh among the leading causes of death in the U.S. Additionally diabetes is a major risk factor for heart disease and stroke.

*Diabetes mellitus* is a metabolic disorder characterized by altered glucose regulation and utilization, usually caused by inadequate production of insulin or from ineffectiveness of available insulin. Diabetes is not one disease but several.

There are two major types of diabetes mellitus:
**Type 1:** Individuals with this type produce little or no insulin. They are dependent on insulin injections. Most commonly appears in childhood or young adults but can occur at any age. This type makes up only 5 to 10% of all diabetics in this country.

**Type 2:** Individuals with this type produce insulin but their cells are resistant to the actions of insulin. Some Type 2 diabetics can control their blood glucose with diet and lifestyle measures. However, more than half with this type also need oral drugs to keep glucose within acceptable levels, and 25 to 30% need insulin injections. This type usually appears in middle age, and accounts for about 90 to 95% of all diabetics.

1. Risk factors for diabetes.
Before the onset of diabetes mellitus, impaired glucose tolerance comes first. The risk factors given here are for impaired glucose tolerance, which in some cases may never develop into diabetes.
• Obesity. Precedes or accompanies diabetes in 85% of cases.
• Age. The incidence of impaired glucose tolerance increases with age.
• Family history.
• Gestational diabetes. Often a forerunner of Type 2 diabetes.
2. Recommendations for Preventing Diabetes. Health care authorities recommend screening for impaired glucose tolerance. Those who have it are counseled to observe the following preventive measures:

- Lose weight, if necessary.
- If pregnant, gain appropriate weight without excess.
- Increase physical activity; regular exercise improves glucose tolerance.
- Replace rapidly absorbed carbohydrates, i.e. simple sugars, with complex and high-fiber carbohydrates.
- Reduce intake of saturated fat.
- Control hypertension, if present.

It should be emphasized that impaired glucose tolerance may never develop to diabetes if blood glucose levels are controlled successfully through these preventive measures.
ACTIVITY V-1: Health Risk Appraisal

1. Do the *Health Risk Appraisal* on yourself. Compare your total score with the scoring guidelines and determine your health risk.

2. For each lifestyle risk that needs to be changed, outline a specific plan to modify that risk. Make sure that your plan is something you can accomplish.
TAKE HOME ASSIGNMENT V-1--Using the Exchange List

DIRECTIONS:
1. Choose one day of your food intake that you used for computer nutrient analysis.
2. Using the Exchange List (Appendix C-1 to C-9 in the textbook) estimate the carbohydrate, protein, fat, and total kcalories of the foods eaten for the day.
3. Be sure to use the form below.
4. Compare totals with the computerized nutrient analysis. (25 points)

NAME: ___________________

<table>
<thead>
<tr>
<th>MENU:</th>
<th>Breakfast</th>
<th>Lunch</th>
<th>Dinner</th>
<th>Snacks</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>EXCHANGE LIST (portion/food)</th>
<th>Total No. of Exchanges</th>
<th>CHO (gms)</th>
<th>PRO (gms)</th>
<th>FAT (gms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starch List</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit List</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk List (Circle: NF, LF, whole)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Carbohydrate List</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Vegetable List</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat/Meat Substitute List</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Very lean =</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Lean =</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Medium fat=</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. High fat =</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Fat List</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Combination Foods List</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free Foods List</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

kcal = _____ gm CHO x 4 = _____

_____ gm Pro x 4 = _____

_____ gm Fat x 9 = _____

_______ TOTAL kcal
Lesson V-2

NUTRITION SCREENING & ASSESSMENT: Adults 18 to 60 Years

OBJECTIVES:

In this lesson, the student will:

1. Describe parameters used in the nutrition screening of adults ages 18 to 60 years.
2. Review method of calculating body mass index (BMI) and its significance.
3. Practice calculating the following: percent of usual body weight, percent weight change, waist-hip ratio.
4. Practice measuring wrist circumference and use to calculate frame size.
5. Identify biochemical screening methods used to detect anemia, heart disease and diabetes mellitus.
6. Become familiar with parameters used in intermediate level of nutrition assessment.

ASSIGNMENTS: 1. Read Lesson V-2, Nutrition Screening & Assessment: Adults 18 to 60 Years.

MATERIAL: Activity Work Sheet (1)
Insertion tape, bring calculator

I. ANTHROPOMETRIC DATA FOR SCREENING

A. Height and Weight

Height and weight must be measured accurately, using the correct techniques.

Height is an indicator of long-term nutrition, while weight reflects more recent nutrition. In interpreting weight, the individual's height, sex, age, physical fitness and state of hydration must be taken into consideration, since these factors may significantly affect weight.

1. Determining Desirable Weight

a. Use Height-Weight Tables

Although height-weight tables have their limitations, they are useful as a screening/health education tool. However, they should be considered only as a rough guide in helping clients determine within what range their weight should fall.
Height and weight measurements can be compared to height-weight tables such as those published in 1983 by the Metropolitan Life Insurance Company. The table gives average weights for men and women at ages 25 to 59 years, based on lowest mortality. In 1995, the Advisory Committee on Dietary Guidelines for Americans published the *Suggested Weights for Adults* giving suggested weight range for height and a midpoint weight. (See Table 7-1 on page 138 in the textbook.)

b. Calculate Desirable Weight

Females: 100 pound for 5 feet + 5 pounds for each additional inch over 5 feet (medium frame). (For small frame -10%; large frame +10%).

Males: 106 pounds for 5 feet + 6 pounds for each additional inch over 5 feet (medium frame). (For small frame -10%; large frame +10%).

2. Determining Frame Size

The wrist is a good indicator of skeletal size. Therefore, its circumference is used as an indicator of frame size.

a. Method of measurement

1) The right arm should be bent at the elbow, with the palm facing upward and the hand muscles relaxed.

2) Use a measuring tape no wider than 0.7 cm, so that it can fit into the depression.

3) Place the measuring tape around the wrist depression just beyond the two bony prominences at the wrist (styloid processes of the ulna and radius).

4) Check that the tape is touching the skin but not compressing soft tissues.

5) Read and record measurement to the nearest 0.1 cm.

b. Calculate frame size

\[
\text{Frame size} = \frac{\text{Height in cm}}{\text{Wrist circumference in cm}}
\]

c. Compare value with chart to determine frame size

<table>
<thead>
<tr>
<th></th>
<th>Large</th>
<th>Medium</th>
<th>Small</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>&lt; 9.6</td>
<td>9.6 - 10.4</td>
<td>&gt; 10.4</td>
</tr>
<tr>
<td>Women</td>
<td>&lt; 10.1</td>
<td>10.1 - 11.0</td>
<td>&gt; 11.0</td>
</tr>
</tbody>
</table>
3. **Body Mass Index (BMI)**

Body mass index has a relatively high correlation with estimates of body fatness. It is particularly useful when used along with skinfold measurements to estimate body fat.

BMI is calculated from height and weight using the following formula:

$$\text{BMI}(\text{kg/m}^2) = \frac{\text{Weight in lbs.}}{\text{height in inches} \times \text{height in inches}} \times 705$$

BMI ranges and relative weight classifications for ages 18 to 65 years are:

<table>
<thead>
<tr>
<th>BMI (kg/m²)</th>
<th>Weight Classifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>&lt; 20.7</td>
<td>&lt; 19.1</td>
</tr>
<tr>
<td>20.7 to 27.8</td>
<td>19.1 to 27.3</td>
</tr>
<tr>
<td>≥ 27.8</td>
<td>≥ 27.3</td>
</tr>
<tr>
<td>≥ 31.1</td>
<td>≥ 32.3</td>
</tr>
<tr>
<td>≥ 45.4</td>
<td>≥ 44.8</td>
</tr>
</tbody>
</table>

4. **Percent of Usual Body Weight**

Comparing current body weight with usual weight is another index of nutritional status. The percent of usual body weight can be calculated as follows:

$$\% \text{ of usual body weight} = \frac{\text{current weight}}{\text{usual weight}} \times 100$$

An additional consideration is the rate at which weight loss occurred. A rapid loss indicates a catabolic state with a loss of muscle protein. (One word of caution: If client is dehydrated or edematous, the weight data will be misleading.) Percent of weight change is calculated as follows:

$$\% \text{ of recent weight change} = \frac{\text{recent weight loss}}{\text{usual weight}} \times 100$$

**Evaluation of Weight Change**

<table>
<thead>
<tr>
<th>Period of Time</th>
<th>Significant Weight Loss (% weight change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 week</td>
<td>1-2</td>
</tr>
<tr>
<td>1 month</td>
<td>5</td>
</tr>
<tr>
<td>3 months</td>
<td>7.5</td>
</tr>
<tr>
<td>6 months</td>
<td>10</td>
</tr>
</tbody>
</table>
Any significant weight change should be referred to R.D./nutritionist for further investigation and intervention.

5. **Waist-to-Hip Ratio (WHR)**

Determining the ratio of the waist circumference to the hip is an easy way to assess regional body fat distribution. WHR provides a valuable guide in assessing health risk associated with fat carried in the trunk area compared to fat in the thighs. These health risks include diabetes, elevated lipids, hypertension, stroke and overall increased mortality.

a) **Method of Measurement**

   (1) Waist circumference is measured with the client standing erect, abdominal muscles relaxed, arms at the side and feet together. Measurement is taken at the narrowest area below the rib cage and above the umbilicus. Measurement should be recorded to the nearest 0.1 cm.

   (2) Hip measurement is taken at the widest point around the buttocks, with the client standing erect. Measurement should be recorded to the nearest 0.1 cm.

b) **Calculation of WHR**

\[
\text{WHR} = \frac{\text{Waist in cm}}{\text{Hips in cm}}
\]

c) **Interpretation**

Risk of disease rises steeply when WHR rises above 0.9 in males and above 0.8 in females.

II. **BIOCHEMICAL DATA FOR SCREENING**

Biochemical tests for screening are targeted toward the three common health problems of adults. They include the following:

<table>
<thead>
<tr>
<th>Biochemical Test</th>
<th>Screen for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin, Hematocrit</td>
<td>Anemia</td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>Heart disease risk</td>
</tr>
<tr>
<td>Blood glucose</td>
<td>Diabetes mellitus</td>
</tr>
</tbody>
</table>
A. **Hemoglobin/Hematocrit**

Review these tests, which were discussed earlier. Normal values are:

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin:</td>
<td>14 to 18 gm/dl</td>
<td>12 to 16 gm/dl</td>
</tr>
<tr>
<td>Hematocrit:</td>
<td>40% to 54%</td>
<td>37% to 47%</td>
</tr>
</tbody>
</table>

B. **Total Cholesterol**

Blood cholesterol screening is measured from a drop of blood obtained by pricking a finger and analyzing it immediately using a portable machine. Since this method provides only approximate values, any values over 200 mg/dl should be re-checked by a second test performed by a physician on a blood sample drawn from the arm.

All adults age 20 or older should have a blood cholesterol test and lipid profile on a blood sample drawn from the arm at least every 5 years. This test should be performed after an 8 to 12 hour fast. Guidelines for recommended action and referral of clients based on blood cholesterol levels are:

<table>
<thead>
<tr>
<th>Blood Cholesterol Level</th>
<th>Recommended Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 200 mg/dl</td>
<td>Desirable level. Repeat test within 5 years.</td>
</tr>
<tr>
<td>200-239 mg/dl</td>
<td>Borderline high. Refer to R.D. or physician for follow-up if a history or risk factor for coronary heart disease exists.</td>
</tr>
<tr>
<td>240 mg/dl or higher</td>
<td>High. Refer to physician and R.D. for follow-up.</td>
</tr>
</tbody>
</table>

C. **Blood Glucose**

Blood glucose screening for diabetes mellitus is done on a drop of blood obtained from a finger prick. Normal values for fasting blood glucose is 60 to 100 mg/dl. Values above 150 mg/dl should be referred to a physician for further assessment.

III. **DIETARY DATA FOR SCREENING**

The food frequency questionnaire is usually the method used for dietary screening.
INTERMEDIATE LEVEL OF NUTRITION ASSESSMENT

Intermediate level of nutrition assessment is needed if abnormalities are identified during a nutrition screening. Further evaluation of nutrition status is conducted with particular attention to protein-calorie status. Protein-calorie malnutrition has been shown to increase morbidity and mortality as a result of delayed wound healing, decreased resistance to infection and impaired pulmonary function.

Protein-calorie status is evaluated primarily by anthropometric and biochemical methods which measure three body compartments: body fat stores (adipose tissue), skeletal protein mass (skeletal muscle), and visceral proteins (serum proteins). The following methods are commonly used to assess these body compartments.

1. **Body fat stores** (adipose tissue)
   - body weight
   - body mass index (BMI)
   - skinfold measurements

2. **Skeletal protein mass** (skeletal muscle)
   - body weight
   - arm muscle circumference (AMC)
   - creatinine height index (CHI)

3. **Visceral proteins** (serum proteins)
   - serum albumin
   - serum transferrin

**NOTE:** Only methods that have not been covered in previous lessons will be discussed here. Review the following: body weight and body mass index.

I. **ANTHROPOMETRIC DATA**

A. **Skinfold Measurements**

Skinfold measurements obtained from various sites and used in combination give the most accurate indication of the body’s fat stores. Sites used include the *triceps*, *subscapular*, *chest*, *abdomen*, *thigh*, and *suprailiac* area.
Multiple-site skinfold combinations which give percent body fat:

Men: chest (pectoral), abdominal and thigh
Women: triceps, thigh and suprailiac.

Using the sum from these skinfolds, the nomogram can be used to determine the percent body fat.

II. BIOCHEMICAL DATA

A. Creatinine-Height Index (CHI)

Creatinine-height index is used as a biochemical method to assess skeletal protein mass. Creatinine is released from muscle tissue at a fairly constant rate. Therefore, urinary creatinine is proportional to muscle mass, provided renal function is normal.

CHI is the client's 24-hour urinary creatinine compared to the expected creatinine excretion of an individual of the same sex and height. The expected creatinine excretion is obtained from a table:

\[
\% \text{ CHI} = \frac{\text{Actual urinary creatinine}}{\text{Expected urinary creatinine}} \times 100
\]

Interpretation of values:
- CHI 60-80 %: moderate depletion of skeletal protein mass
- < 60 %: severe depletion of skeletal protein mass

B. Serum Albumin

Serum albumin is a routinely available test for visceral protein in the hospital setting. However, because of its relatively long half-life of 20 days, it is not a sensitive indicator of changes in protein status.

Interpretation of values:
- 3.5 - 5.5 gm/dl normal
- 2.8 - 3.4 gm/dl mild depletion of visceral protein
- 2.1 - 2.7 gm/dl moderate depletion
- < 2.1 gm/dl severe depletion

C. Serum transferrin (TF)

Serum transferrin is a protein that transports iron in the plasma. It has a shorter half-life of 8 - 10 days. Therefore, it more readily reflects changes in visceral protein status than serum albumin.

Serum transferrin can be measured directly. However, since the test is not routinely available in many laboratories, it is more common to calculate serum transferrin from total iron-binding capacity (TIBC), a more widely available test. The formula is:
Serum transferrin (mg/dl) = (0.68 x TIBC in µg/dl) + 21

Interpretation of values:
- > 200 mg/dl: normal
- 151-200 mg/dl: mild depletion of visceral protein
- 100-150 mg/dl: moderate depletion
- < 100 mg/dl: severe depletion

III. CLINICAL DATA

IV. DIETARY DATA
ACTIVITY V - 2 - ANTHROPOMETRIC PRACTICE

1. Using your height and weight data, calculate the following and compare to reference values, if appropriate:

(a) Desirable Weight

(b) BMI

2. Take turns obtaining the following measurements on each other using correct techniques: (1) wrist circumference, (2) waist circumference, and (3) hip circumference. Then, using your own measurements, calculate the following and compare to reference values:

(a) Frame size

(b) Waist-to-hip ratio
Lesson VI-1

NUTRITION & ASSESSMENT IN LATER YEARS
Nutritional Needs and Nutrition-Related Concerns

OBJECTIVES:

In this lesson, the student will:

1. Describe physiologic and other changes that occur with aging.
2. Discuss the nutritional implications of these changes.
3. Describe the nutrient needs of older adults.
4. Discuss factors that influence the food choices of older adults and factors that adversely affect nutritional status.

ASSIGNMENTS:

MATERIALS: Videotape: Nutrition for the Over 50 Gang

The fastest growing segment of the U.S. population are persons 60 years of age or older. In this country age 65 has been arbitrarily used as the transition point from middle age to old age. However, the process of aging happens gradually over time starting from about age 30. The rate of aging also varies considerably among individuals. This explains why some individuals seem young for their chronological ages while others seem older. Healthy lifestyle behaviors, discussed in the lesson on adulthood, seem to have a significant influence on how one ages physiologically, i.e. physiologic age.

I. PHYSIOLOGICAL AND PHYSICAL CHANGES

The physiological changes that occur with aging affect nutritional status just as growth and development do earlier in the life cycle. Many physical changes can also affect the older adult's ability to eat adequately.

A. Body Composition

The following changes in body composition occur due to hormonal changes, but to a certain degree good nutrition and physical activity can minimize these changes.
- decrease in lean body mass resulting in decrease in basal metabolic rate (BMR),
- increase in body fat and redistribution from subcutaneous to internal fat,
- decrease in bone mass or density,
- decrease in height due to thinning of disks between vertebrae and of the vertebrae itself, and
• decrease in total body water due to a decrease in extracellular water.

Nutritional implications include:
• decrease in BMR plus a reduction in activity level will require less calories to maintain weight, 
• decrease in bone mass places individuals at risk for osteoporosis so calcium intake should be optimal, and
• decrease in total body water makes older persons more at risk of dehydration.

B. Gastrointestinal Tract

• decrease in motility resulting in longer emptying of the stomach, due to loss of strength and elasticity of intestinal walls with aging, and
• reduced production and secretion of hydrochloric acid, pepsin, and gastric mucus, and
• decreased production of saliva.

Nutritional implications include:
• less saliva results in dry mouth and decreased initial digestion of starches,
• decreased absorption of vitamin B$_{12}$, biotin, calcium, iron, and possibly zinc, and
• common occurrence of constipation. In addition to decreased motility, other factors that contribute to constipation are: diet low in fiber and fluids, lack of exercise, side effects of drugs, laxative abuse, and irregular bowel habits.

C. Cardiovascular System

• decrease in the size of the heart and changes in the relative size of the chambers within the heart, and
• loss of elasticity in blood vessels.

Implications include:
• decreased ability of heart muscle to use oxygen so that physical stress is not as well tolerated, and
• more difficult for the heart to pump blood through the blood vessels.

D. Renal System

Decrease in size of the kidneys and occurrence of functional abnormalities result in decreased renal blood flow and ability to clear drugs and metabolic wastes from the blood. Nutritional implications due to these changes are:
• decreased efficiency in handling sodium resulting in sodium retention or excessive losses, and
• decreased ability to handle protein waste products such as creatinine, urea, etc.

E. Nervous System

• reduction in actual number of taste buds,
• decrease in sense of smell, and
• loss of memory, especially short term memory.

Nutritional implications include:
• lack of taste may lead to decrease in food intake, and
• lack of sense of smell contributes decreased ability to taste and enjoy food.

F. Physical Changes

The following physical changes can also limit the ability of the older adult to obtain adequate nourishment.
• loss of teeth and/or gum disease,
• failing eyesight, and
• limitation or loss of mobility.

G. Psychological Changes

Anxiety, apathy, forgetfulness, and depression are not inevitable changes in aging but are common in older adults. All such changes affect the individual's ability and willingness to eat. Support and companionship of family and friends, especially at mealtimes, help improve appetite and food intake at these times.

H. Socio-economic Changes

Ninety-five percent of older adults live within the community with a spouse, a family member or friend, or alone. Only 5% live in long-term care facilities. Although the older population is better off economically compared to previous generations, poverty is still a problem in about 20% of people over 65 years old. Black and Hispanic older adults are more likely to be poor than white older adults.

Inadequate food and nutrition is commonly encountered in people of low socioeconomic status. Studies also show that malnutrition and risk of nutrient deficiencies are high in older adults who are least educated, who are living alone in federally funded housing (indicator of low income), who are males living alone, and who have recently experienced a change in lifestyle.
II. NUTRIENT NEEDS OF OLDER ADULTS

The current Recommended Dietary Allowances (RDA) for older adults have been questioned on several issues. The concerns include the following:

- RDA for adults over age 50 have been derived from those for young adults since there have been very limited number of studies on older adults. (The current RDAs for ages 25 to 50 are essentially the same as for those 51 and older except for iron, thiamin, niacin, and riboflavin. For older women, iron is reduced from 15 mg. to 10 mg. due to cessation of menstrual-associated iron loss; thiamin niacin, and riboflavin are reduced for older men and women to parallel the decrease in energy requirements after age 50.)
- Combine all adults 51 and older into one group in terms of nutrient needs. No adjustments are made although nutrient needs of 50-60 year olds may be very different from adults 80 years or older.
- Difficulty in defining "healthy aging" on which to base the RDA which is intended to meet the "needs of practically all healthy persons."

* The Dietary Reference Intakes (DRI) revision currently under way includes two age categories: 51 to 70 years and older than 70 years

Despite these limitations, the current RDA for older adults can be used as guidelines. However, what is more important when evaluating nutrient needs is to consider each older adult as an individual and take into account his/her general health, physical activity, and presence or absence of chronic disease. Only the nutrients that have been shown to be limiting in the food intake of older adults will be discussed.

C. Water

Older adults are at risk of dehydration since total body water decreases with aging. Additional factors that increase risk in older adults include a reduced sensation of thirst, conscious restriction of fluids in those who have lost bladder control, difficulty in drinking without help, or ingestion of high protein supplements without adequate fluids.

Water recommendation: 1 to 1.5 oz/kg. actual body weight. Older adults should drink a minimum of 6 to 8 glasses of fluid each day. Milk and juices can be counted as part of this fluid but NOT beverages containing caffeine or alcohol due to their diuretic effect. In order to remember and keep track of fluid intake, older adults should measure out the recommended amount of water in a container to keep in the refrigerator to drink throughout the day.
D. **Energy (kcalories)**

Energy needs decrease with age due to a reduction in basal metabolic rate, and reduced physical activity in most. As a rule, adult kcalorie needs decline approximately 5% per decade beginning around age 30. The RDA for energy decreases for both males and females starting at age 51. Because of the lower kcalorie needs to maintain weight, older adults need to select mostly nutrient-dense foods.

C. **Protein**

Total body nitrogen decreases in aging even in well-nourished adults. This decrease is largely due to loss of skeletal muscle.

The current RDA for protein is 0.8 gm./kg. body weight/day, which is the same as for those ages 25-50. However, it appears from at least one study that this amount of protein, even good quality protein, does not assure positive protein balance in many older adults. A suggested safe protein intake for older adults would be 1.0 to 1.25 gm./kg. body weight/day.

D. **Carbohydrates**

Fifty-five percent of kcalories should come from carbohydrates. Adequate carbohydrate is needed to support the use of protein for tissue growth and repair and not for energy.

Most of the carbohydrates should come from complex carbohydrate foods such as whole grain breads/cereals, vegetables, and fruits. These foods also provide essential vitamins, minerals, as well as fiber.

E. **Vitamins**

1. **Vitamin D**

Dietary intakes and serum levels of vitamin D in older adults are less than optimal. There are several factors that place older adults at risk of vitamin D deficiency: (a) limited or no milk intake (vitamin D fortified milk is a significant source of the vitamin), (b) limited exposure to sunlight, (c) use of calcium supplements rather than consuming dairy products as sources of calcium, and (d) age-related decrease in the skin's ability to synthesize vitamin D and the kidneys' ability to convert it to its active form.

The current AI of 10 mcg. (51-70 years) and 15 mcg. (71yrs and older) does not seem to be adequate to preserve optimal vitamin D status in older adults with very limited exposure to sunlight. However, because of the danger of toxicity, vitamin D supplements containing more than 10 mcg. should not be used.
2. Vitamin B₆
Dietary intakes and serum/enzyme levels of vitamin B₆ are low in many older adults. The low levels can be due to: (a) decreased intake of meat, poultry, or fish, (b) instability of the vitamin to heat processing making pre-prepared foods poor sources, and (c) some prescription drugs interfere with B₆ absorption.

The current DRI for older adults are 1.7 mg/day for men and 1.5mg/day for women.

3. Vitamin B₁₂
Older adults may be at risk of vitamin B₁₂ deficiency, particularly those with atrophic gastritis (both intrinsic factor and gastric acid levels are reduced). Since intrinsic factor is required for B₁₂ absorption, and gastric acid is required to release B₁₂ from foods for absorption, the absorption of the vitamin is impaired when levels of either or both substances are reduced.

The DRI recommends that adults 51 years and older need 2.4 mcg. of B₁₂ daily, preferably from fortified foods and supplements which are better absorbed than naturally occurring vitamin B12 in foods.

F. Minerals

1. Iron
Most healthy older adults maintain adequate iron status on the RDA intake of 10 mg./day. However, older women on low energy intakes and older adults with other risk factors are at risk of iron deficiency. These factors include: (a) reduced stomach acid secretion, (b) regular use of antacids, (c) use of certain drugs that bind iron, e.g. cholestyramine, (d) liberal use of fiber, (e) excessive aspirin use leading to GIT bleeding, and (f) any disease condition that causes chronic blood loss. If any of these factors are present, assessment of iron status is indicated.

2. Calcium
The RDA for calcium remains controversial. The calcium AI for ages 51 and older is 1200 mg. daily. Some researchers have shown that calcium intake of 1000 mg. to 1500 mg. per day can actually increase bone density in post-menopausal women. In fact, a National Institutes of Health (NIH) panel has concluded that women over 50 who are not on estrogen replacement and all adults over 65 need 1500 mg. of calcium daily.

Controversy or not regarding calcium needs, one thing is certain: the calcium intakes of older adults, especially women, are well
below the RDA. The lowest calcium intakes in the NHANES III survey were in older black women with median values of 399 mg.

Many older adults who cannot tolerate fresh milk because of lactose intolerance should be counseled to eat other calcium-rich foods. For others, low-fat dairy products, such as adding nonfat dry milk to recipes, provide the needed calcium and vitamin D.

3. Zinc
The diets of older adults are frequently low in zinc. Levels of zinc in the diet are determined by total energy intake, total money spent for food, and food choices. The richest sources of zinc, meat, fish, and poultry, relatively cost more money. Other factors that place older adults at risk of zinc deficiency are less efficient absorption, and use of medications that can reduce zinc absorption or increase its excretion.

Zinc is necessary for taste acuity, wound healing, and the immune response. Nevertheless, older adults should be cautioned against self-medication with zinc supplements, which can actually depress the immune function and lower HDL-cholesterol (the "good" cholesterol).

III. FACTORS THAT INFLUENCE FOOD CHOICES

The food choices of older adults reflect lifelong attitudes and food habits. In addition, their food choices are also influenced by the changes that accompany the experience of getting old in our society. The good news is that surveys in the U.S. show that older adults in general are eating reasonably adequate diets. Some of the major factors influencing food selection patterns are discussed.

A. Psychologic Factors

- Loneliness. Eating is a social activity. Some older adults may adjust poorly to eating alone after the loss of a spouse or friends. Men living alone have been shown to eat poorer-quality diets than those living with spouses.
- Retirement. Usually more time to spend in planning and preparing meals.
- Mental awareness. Individuals who have mental disorders or organic brain syndrome can be confused, irritable and suffer from dementia. These individuals need to be supervised to make sure they eat adequately.

B. Physiologic Factors

- Sensory changes. The decline in the sense of taste and smell may decrease food acceptance and quantity of food eaten.
• Dental problems. Tooth loss and gum disease alter food choices.
• Physical health. Limited vision or impaired mobility make it difficult to shop for groceries and prepare meals. These limitations result in the use of pre-prepared food that are often high in sodium and fat and low in vitamins and trace minerals.
• Special diets. Whether prescribed for a chronic condition or self-prescribed, these diets influence food choices.

C. Socioeconomic Factors

• Income. Many older adults live in poverty. Low income affects food selection in several ways: (a) less money to spend for food, (b) inadequate preparation, storage and cooking facilities, (c) more likely to live in inner cities or rural areas where food is more expensive.
• Availability of transportation. Without adequate transportation, older adults will have to buy groceries from nearby food stores where quality and selection is limited at much higher prices.
• Storage and cooking facilities. Limits the availability and variety of foods eaten.
• Education. Many older adults are interested in their health and respond well to health and nutrition education. Health and nutrition information are provided in senior centers, senior housing complexes, or health care facilities.
  (Appendix J/Handout gives suggestions for shopping and cooking for one.)

IV. ADVERSE INFLUENCES ON OLDER ADULTS NUTRITION

A lot of the psychologic, physiologic and socioeconomic factors discussed above adversely affect nutritional status. In addition, there are other factors that impact older adults' nutritional status.

A. Drug-nutrient interactions

About 25% of all over-the-counter (OTC) and prescription medications are taken by adults over the age of 65. Some older adults take several medications at a time. While these medications usually enable people to enjoy longer quality lives, they can also affect nutritional status adversely. The harmful effects increase if medications are taken over a prolonged period of time, or if the person is in poor nutritional status already. Drugs affect nutrition in the following ways:
• decrease or increase food intake by depressing or stimulating appetite,
• reduce absorption of nutrients,
• alter the metabolism and excretion of nutrients.
B. Smoking and alcohol use

Alcohol is the most common drug that affects nutrition in older adults. Alcohol depresses the appetite, displaces nutrient-dense foods from the diet, and decreases the absorption of thiamin, folate and vitamin $B_{12}$.

C. Health fraud and quackery

Older adults are targets of health claims and quackery promising a "cure" and/or longevity. Many unsuspecting older adults have fallen victims of unqualified health care providers.

The major areas of health fraud and quackery include:

- anti-aging and sex rejuvenation,
- cancer "treatments",
- arthritis "treatments",
- heart disease "treatments", and
- "diagnostic" tests

D. Supplement use

Older adults are also the targets of advertisements for supplements and "health foods" promising good health and longevity. Nutrient supplements are used by about half of all women over 65 and by about one-fifth of older men. However, the supplements being taken were often not the nutrients that are deficient in the user's diet.

Nutrient supplements can be beneficial when recommended by a physician or registered dietitian to remedy a documented deficiency like vitamin D and calcium for osteoporosis or iron for iron-deficiency. Older adults who eat less than 1500 kcalories a day may also benefit from a one-a-day multiple vitamin-mineral supplement - not high potency, megadoses of single vitamins. This is particularly true of vitamin A supplementation. Older adults are less able to clear vitamin A from the blood; therefore, as little as twice the RDA can have toxic effects.

Health care providers should encourage all adults to be informed on health and nutrition issues to be able to make sound decisions about their health.
Lesson VI-2

NUTRITION & ASSESSMENT IN LATER YEARS
Nutrition Screening & Assessment: Adults 60 Years and Older

OBJECTIVES:

In this lesson, the student will:

1. Discuss the factors that contribute to poor nutritional status in the older adult.
2. Identify the common nutrient deficiencies in the older adult.
3. Use the Nutrition Screening Initiative as a screening checklist to assess nutritional risks.
4. Identify the most useful nutrition assessment parameters for this age group.

ASSIGMENTS:

MATERIALS: Take-home Assignment (1).
Handout: Determine Your Nutritional Health

I. NUTRITIONAL RISK FACTORS

Persons 60 years of age or older make up the fastest growing segment of the population in the United States. Many social, physiological and economic factors influence food and nutrient intake in older people. Unfortunately, many of these factors also place a large number in this age group at risk of malnutrition.

The following are the common factors that place the older adult in the United States at increased nutritional risk, as developed by the Nutrition Screening Initiative, which is discussed later.

The warning signs or risk factors can easily be remembered by the acronym DETERMINE, as follows:
Disease. Conditions that affect food intake or nutrient utilization. Examples include:
- arthritis
- diabetes mellitus
- high blood pressure
- heart disease
- depression
- loss of memory
- recent hospitalization or surgery

Eating poorly. This can be defined as:
- fewer than two meals per day,
- few fruits, vegetables or milk products,
- lack of variety in foods, or
- three or more drinks of alcoholic beverages daily.

Tooth loss/mouth pain. This may be caused by:
- missing, loose or decayed teeth,
- ill-fitting dentures,
- sore or bleeding gums, or
- unhealed mouth sores.

Economic hardship. Nutritional risk increases in those who spend less than $25-$30 weekly for food.

Reduced social contact. Those who are lonely and eat alone may lack the incentive to cook and eat.

Multiple medications. Prescribed as well as over-the-counter medications can decrease appetite, decrease absorption, affect utilization and/or increase excretion of certain nutrients. Some examples include:
- aspirin (salicylates) - prolonged use can cause gastrointestinal bleeding and subsequent iron-deficiency anemia.
- laxatives deplete the body of sodium and potassium.
- aluminum hydroxide antacids can cause phosphate depletion and increase bone loss.
- most diuretics also cause loss of potassium.
- digoxin causes anorexia and nausea.

Involuntary weight loss or gain. This may indicate not only increased nutritional risk, but a medical problem.

Needs assistance in self care. Limited mobility, physical frailty and/or loss of sight hinder the ability to shop for food and cook.

Elder years above age 80. As age increases, risk of frailty and health problems increase.
II. COMMON NUTRIENT DEFICIENCIES

Vitamins and minerals are the nutrients most likely to be lacking in an older person’s diet and are also most adversely affected by multiple medications commonly encountered in this age group. Therefore, it is not surprising that the nutrient deficiencies seen in older adults include: vitamin B-6, vitamin B-12, folic acid, vitamin D, and calcium.

III. NUTRITION SCREENING INITIATIVE

The nutrition professional has the important task of identifying those older adults at nutritional risk, so that early intervention can prevent further deterioration in health.

As a joint project, the American Academy of Family Physicians, the American Dietetic Association and the National Council on the Aging developed *Determine Your Nutritional Health* (Figure VI-2) as a tool to identify older adults at nutritional risk. It is a checklist of nine factors that affect the nutritional status of older adults.

This checklist has been adopted by many long-term care facilities to perform nutrition screening on long-term care residents upon admission.

Older adults with scores of 6 or higher should be referred to a nutrition or other health professional for assessment and intervention.

INTERMEDIATE LEVEL OF NUTRITION ASSESSMENT

Intermediate nutrition assessment must be done on any older adult who is identified as being at high nutritional risk, i.e., a score of 6 or higher on the Nutrition Screening Initiative checklist.

Since the process of aging brings about physiological changes, standards used to assess nutrition status also change. Many of the measurements and standards used to evaluate the nutritional status of young or middle-aged adults are unreliable when used in older adults. Accurate assessment and interpretation will depend to a large extent on using appropriate age-specific parameters and standards.

I. ANTHROPOMETRIC DATA

Useful anthropometric measurements for older adults include the following:

- height,
- current and usual weight, and
- history of recent weight change(s).

In collecting and interpreting assessment data, the effects of aging on body composition and anthropometric measurements must be taken into consideration. Changes in aging include:
• Weight: Men steadily gain weight until about age 45, while women gain until age 60. Then average weights decline or plateau.
• Height: Decreases with age due to bone disease, vertebral collapse or postural changes.
• Body fat: Increases. There is also redistribution from subcutaneous fat to internal fat, and between different subcutaneous sites.
• Lean body mass: Decreases. This is mainly due to loss in skeletal muscle.
• Skinfold: Often pendulous and difficult to measure due to loss of elasticity.

INTERPRETATION:

Measurements of weight and height can be evaluated as follows:

A. Compare with average height-weight tables for men and women 65 years of age and over.

B. Calculate body mass index (BMI). This is the preferred method because body composition changes at different rates in older adults.

\[
\text{BMI} = \frac{\text{Weight in lbs}}{(\text{ht in inches} \times \text{ht in inches})} \times 705
\]

- < 21 Underweight
- 21 to 27 Normal Weight
- >27 Overweight

NOTE: This standard is for older adults. In younger adults, normal value for BMI is 20 to 25.

C. Calculate percent of recent weight change.

\[
\text{% Weight Change} = \frac{\text{Weight Change}}{\text{Usual Weight}} \times 100
\]

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Significant % Weight Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 week</td>
<td>1 - 2%</td>
</tr>
<tr>
<td>1 month</td>
<td>5.0%</td>
</tr>
<tr>
<td>3 months</td>
<td>7.5%</td>
</tr>
<tr>
<td>6 months</td>
<td>10.0%</td>
</tr>
</tbody>
</table>
II. BIOCHEMICAL DATA

Biochemical assessment of older adults should include tests of iron status (hemoglobin and hematocrit), protein (serum albumin), and glucose status (blood glucose). Vitamin deficiencies, if suspected, should be confirmed using appropriate biochemical tests.

If disease conditions are suspected, laboratory screening tests to determine organ function are ordered.

Some factors to keep in mind in the biochemical assessment of older adults are:

- nutrition-related anemia, mostly due to dietary intake, malabsorption or a disease state, are more common in older than in younger adults;
- adults over 60 who present unexplained weight loss, fatigue, depression, dementia or irregular heartbeat should be screened for thyroid function since thyroid hormones decrease with aging;
- a sudden drop in serum cholesterol in a short period of time may indicate recent inadequate intake;
- serum albumin is a simple and reliable index of long-term protein-calorie status in older adults;
- hydration status as well as disease conditions can influence test results and must be considered when interpreting results;
- whenever available, specific biochemical standards for older adults must be used for comparing test results; and
- interpretation of biochemical data in older adults is extremely complex.

III. CLINICAL DATA

Clinical assessment in the intermediate assessment of older adults should include the following:

A. Medical history: Factors affecting nutrition such as weight and appetite changes, gastrointestinal disturbances (diarrhea, constipation, nausea, vomiting, indigestion), changes in sensory abilities, oral health. Record of medications taken, both prescription and over-the-counter drugs, smoking and drinking habits. Disease conditions present.

B. Social history: Include information on living situation and other factors that may detract from the ability to get food. Some examples include whether the individual lives alone or with someone, socio-economic situation, ability to care for self, do food shopping and preparation, and manage medications, etc.
C. **Physical examination**: Careful examination should focus on:
- physical signs of malnutrition, being careful to differentiate from signs of aging;
- mouth and gums for ability to chew and swallow;
- signs of muscle wasting and edema, which may indicate protein-calorie deficits;
- presence of pallor, fatigue and weakness which may indicate iron deficiency;
- signs of adequate hydration status; and
- determination of mental status.

IV. **DIETARY DATA**

A food frequency and/or a 24-hour recall are used to collect data on food intake. Information collected should include:

- past and current diet modifications,
- kinds and amounts of foods eaten and how often,
- size and number of servings in each food group,
- problems with chewing or swallowing,
- fluid intake,
- amount of alcohol consumed,
- food intolerances or allergies,
- kind and frequency of physical activity, and
- approximate amount of money spent on food weekly.
Determine Your Nutritional Health

The Warning Signs of poor nutritional health are often overlooked. Use this checklist to find out if you or someone you know is at nutritional risk.

Read the statements below. Circle the number in the “yes” column for those that apply to you or someone you know. For each “yes” answer, score the number in the box. Total your nutritional score.

<table>
<thead>
<tr>
<th>Statement</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have an illness or condition that made me change the kind and/or amount of food I eat.</td>
<td>2</td>
</tr>
<tr>
<td>I eat fewer than 2 meals per day.</td>
<td>3</td>
</tr>
<tr>
<td>I eat few fruits or vegetables, or milk products.</td>
<td>2</td>
</tr>
<tr>
<td>I have 3 or more drinks of beer, liquor or wine almost every day.</td>
<td>2</td>
</tr>
<tr>
<td>I have tooth or mouth problems that make it hard for me to eat.</td>
<td>2</td>
</tr>
<tr>
<td>I don’t always have enough money to buy the food I need.</td>
<td>4</td>
</tr>
<tr>
<td>I eat alone most of the time.</td>
<td>1</td>
</tr>
<tr>
<td>I take 3 or more different prescribed or over-the-counter drugs a day.</td>
<td>1</td>
</tr>
<tr>
<td>Without wanting to, I have lost or gained 10 pounds in the last 6 months.</td>
<td>2</td>
</tr>
<tr>
<td>I am not always physically able to shop, cook and/or feed myself.</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total your nutritional score. If it’s —

0-2 **Good!** Recheck your nutritional score in 6 months.

3-5 **You are at moderate nutritional risk.** See what can be done to improve your eating habits and lifestyle. Your office on aging, senior nutrition program, senior citizens center or health department can help. Recheck your nutritional score in 3 months.

6 or more **You are at high nutritional risk.** Take this checklist next time you see your doctor, dietitian or other qualified health or social service professional. Talk with them about any problems you may have. Ask for help to improve your nutritional health.

ASSIGNMENT VI-2 - Case Study of an Elderly Man

Directions: Read the following case of an elderly client. Then, apply what you just learned from the on Nutrition & Assessment in Later Years to answer the following questions the following questions. (15 points)

Mr. T. is a 76 year-old widower who lives alone. He has steadily been losing weight since he lost his wife a year ago. At 5 feet 8 inches tall, he currently weighs 124 pounds. His previous weight was 150 pounds.

In talking to Mr. T, you realize that he is reluctant to talk about food, let alone eat it. “My wife always did the cooking before, and I ate well. Now, I just don’t feel like eating.” You find out that he skips breakfast, has soup and bread for lunch, and a cold-cut sandwich or a frozen dinner for supper.

Mr. T has lost several teeth and does not eat any raw fruits or vegetables because he finds them difficult to chew. He lives on a meager but adequate income. He seldom sees friends or relatives.

1. Calculate Mr. T’s BMI and determine his weight status (category).

2. Calculate his % weight loss. Is it significant?

3. Using Figure VI-2 Determine Your Nutritional Health, screen Mr. T’s nutritional risk (low, moderate or high risk). List the factors that put him at nutritional risk.

4. List the nutrients that are likely to be deficient in his diet.

5. Suggest ways that Mr. T can improve his food intake and his lifestyle.