Objectives

- Describe the health consequences of obesity.
- Expose some popular fad diets and myths and fallacies regarding weight control.
- Describe eating disorders and their associated medical problems and behavior patterns, and outline the need for professional help in treating these conditions.
- Explain the physiology of weight loss, including set-point theory and the effects of diet on basal metabolic rate.
- Explain the role of a lifetime exercise program as the key to a successful weight loss and weight maintenance program.
- Describe behavior modification techniques that help support adherence to a lifetime weight maintenance program.

Introduction

- **Overweight**: A chronic disease characterized by a body mass index (BMI) greater than 25 but less than 30
- **Obesity**: A chronic disease characterized by a body mass index (BMI) 30 or higher
- Obesity puts people at greater risk for early death
  - A primary objective to achieve overall physical fitness and enhanced quality of life is to attain recommended body composition.
Introduction

- Obesity is an epidemic
- About 68% of U.S. adults are overweight and 34% are obese

Obesity rates have increased over time

- Between 1960 and 2002, the prevalence of adult obesity increased from about 13% to 30%
Obesity rates vary among populations

- Obesity rates are higher for some ethnic groups and variation is also level of education completed

Health Consequences of Excessive Body Weight

- Being overweight or obese increases the risk for:
  - High blood pressure
  - Elevated blood lipids (high blood cholesterol and triglycerides)
  - Type 2 (non-insulin-dependent) diabetes
  - Insulin resistance, glucose intolerance
  - Coronary heart disease
  - Arteriosclerosis
  - Congestive heart failure
  - Stroke
  - Gallbladder disease
  - Gout
  - Osteoarthritis
  - Obstructive sleep apnea and respiratory problems
  - Some types of cancer (endometrial, breast, prostate, and colon)

- Complications of pregnancy (gestational diabetes, gestational hypertension, pre-eclampsia, and complications during C-sections)
- Poor female reproductive health (menstrual irregularities, infertility, irregular menses)
- Bladder control problems (incontinence)
- Psychological disorders (depression, eating disorders, distorted body image, discrimination, and low self-esteem)
- Shortened life expectancy
- Decreased quality of life

Being overweight is different than being obese

- Health risks from being overweight are most serious for those with Type 2 diabetes and other cardiovascular risk factors
- Years of life lost if overweight during middle life (30-49 years old):
  - 30 pounds or more overweight = 7 years lost
  - 10-30 pounds overweight = 3 years lost
**Tolerable Weight**

- Hereditary factors determine body shape and type.
  - Most people cannot attain the "perfect body."
  - Extreme discipline is required for the few who
- Ask “Am I happy with my weight?”
  - Being happy with self is part of enjoying a higher quality of life.
  - If one is not happy with the current body weight, either:
    - Do something about it

**The Weight Loss Dilemma**

- Frequent fluctuations in body weight increases the risk of dying from cardiovascular disease
- Most people are unsuccessful at maintaining weight loss with diet alone
  - Only 10% of those who choose to diet alone are successful at permanent weight loss...
  - And 5% of those are able to keep it off.

**The Weight Loss Dilemma**

- Traditional diets have failed because few incorporate permanent behavioral changes.
- Underestimations
  - Caloric intake
  - Energy output
Diet Crazes

- In crash diets, close to half the weight lost is through the use of glycogen storage
  - Glycogen is the form in which carbohydrates are stored in the human body, predominately in the liver and muscles
- Most people are unsuccessful at maintaining weight loss with diet alone
- The body resists permanent weight changes through caloric restriction
- See popular Diets on page 159

Low-Carb Diets

- Limit the intake of carbohydrate-rich foods, but allow all the protein-rich foods.
  - Diets are high in protein and fat
- During digestion, carbohydrates are converted into glucose, whose level in the bloodstream is regulated by insulin.
- How LCHP diets create weight loss
- Review summary box on page 161

Glycemic Index of Selected Foods

- A high glycemic index signifies a food that causes a quick rise in blood glucose
- The index is based on the speed of absorption
  - Processed foods tend to have a high glycemic index
  - High-fiber foods tend to have a lower index
- Combining high- with low-glycemic index items or with some fat and protein brings down the average index.
Without fruits, vegetables, whole grains, high-protein diets lack many vitamins, minerals, antioxidants, phytonutrients, and fiber that protect against various ailments and diseases. Long-term adherence to a LCHP diet may increase one's risk for heart disease, cancer, and osteoporosis.

Low-Carb Diets

- Low-carbohydrate/high-protein diets create nutritional deficiencies and contribute to the development of cardiovascular disease, cancer, and osteoporosis.

Recognizing fad diets

- Some key characteristics of fad diets are:
  - Restrict food selection or focus on a single food
  - Use liquid formulas instead of food
  - Promise miraculous results or ‘painless’ weight loss
  - Are based on testimonials or a ‘scientific breakthrough’
  - Based on pseudo claims that excessive weight is related to specific conditions
  - Do not involve physical activity or behavioral changes

Eating Disorders

- Medical illnesses involving critical disturbances in eating behaviors.
- Stemming from some combination of environmental pressures.
  - Most people who suffer from eating disorders are afflicted by significant family and social problems.
  - The eating disorder becomes the coping mechanism.
- Although frequently seen in young women, the disorder is most prevalent among individuals between the ages of 25 and 30.
  - One in ten cases are seen in men.
- Eating disorders develop in stages.
  - The syndrome typically emerges following emotional issues or a stressful life event and the uncertainty about one’s ability to cope efficiently.
Eating Disorders – Anorexia Nervosa

- Self-imposed starvation to lose and maintain very low body weight.
  - Weight gain is feared more than death from starvation.
  - There is a distorted image of the body; it is viewed as being fat when it is actually emaciated.
  - They are preoccupied with food, meal planning, and grocery shopping, and they have unusual eating habits.

- About 20% of anorexics die as a result of their condition.
- Treatment consists of a combination of medical and psychological techniques to restore proper nutrition, prevent medical complications, and modify the environment or events that triggered the syndrome.

- Typical changes associated with anorexia nervosa
  - Many can be reversed
    - Malnutrition
    - Amenorrhea
    - Digestive problems
    - Extreme sensitivity to cold
    - Growth of fine body hair, dry skin
    - Fluid and electrolyte abnormalities
    - Injuries to nerves and tendons
    - Immune function abnormalities
    - Anemia
    - Mental confusion
    - Inability to concentrate, lethargy and depression
    - Osteoporosis
    - Malnutrition
    - Amenorrhea
    - Digestive problems
    - Extreme sensitivity to cold
    - Growth of fine body hair, dry skin
    - Fluid and electrolyte abnormalities
    - Injuries to nerves and tendons
    - Immune function abnormalities
    - Anemia
    - Mental confusion
    - Inability to concentrate, lethargy and depression
    - Osteoporosis

Eating Disorders – Bulimia Nervosa

- Binge eating followed by the purging of the stomach’s contents.
- More prevalent than anorexia nervosa.
- Bulimics tend to be emotionally insecure and abnormally concerned with food and recommended body weight.
**Eating Disorders – Bulimia Nervosa**

- Binge-purge cycle occurs in stages
- Medical problems
  - Cardiac arrhythmias, Amenorrhea, Kidney and bladder damage, Ulcers, Colitis, Tearing of the esophagus and stomach, Tooth erosion and gum damage, General muscular weakness
- Bulimia nervosa can be treated successfully when the person realizes that this destructive behavior is not the solution to life's problems

**Eating Disorders – Binge-Eating Disorder**

- The most common of the three eating disorders, affecting about 2 percent of American adults in any six-month period.
- Characterized by uncontrollable episodes of eating excessive amounts of food within a relatively short period of time.
  - Eating what most people think is an unusually large amount of food.
  - Eating until uncomfortably full.
  - Eating is out of control.
  - Eating much faster than usual during binge episodes.
  - Eating alone due to embarrassment by how much food is consumed.
  - Feeling disgusted, depressed, or guilty after overeating.

**Emotional eating is also a form of disordered eating**

- Characterized by the consumption of large quantities of food to suppress negative emotions
- Suggestions:
  - Learn to differentiate between emotional and physical hunger
  - Avoid storing and snacking on unhealthy foods
  - Keep healthy snacks handy
  - Keep a ‘trigger’ log to identify what triggers emotional food consumption
  - Work it out with exercise instead of food
Treatment for eating disorders

- Confidential support is available through community support groups
- Hospitals often have treatment programs
- On-campus support through the counseling center or health center

Physiology of weight loss

- Three traditional assumptions related to weight control:
  1. Balancing food intake against output allows person to achieve recommended weight
  2. All fat people simply eat too much
  3. Human body doesn’t care how much (or little) it stores
- These statements are open to debate and research
- Weight gain is complex and involves genetics, behavior, and lifestyle factors.

The Physiology of Weight Loss

- Energy-balancing equation
  - One pound of fat is the equivalent of 3,500 calories
  - In theory, if a person requiring 3,500 calories a day decreased intake by 500 calories per day, the person should lose 1 pound of fat in 7 days ($500 \times 7 = 3,500$)
  - When dieters balance caloric input against caloric output, weight loss does not always result as predicted
The Physiology of Weight Loss

- The total daily energy requirement has three basic components
  - **Resting metabolic rate (RMR)**
    - the energy requirement to maintain the body's vital processes in the resting state
    - Accounts for about 60%-70% of the total daily energy requirement
  - **Thermic effect of food (TEF)**
    - the energy required to digest, absorb, and store food
    - Accounts for about 5%-10% of the total daily requirement
  - **Physical activity (PA)**
    - Accounts for 15%-30% of the total daily requirement

**Set-point theory of weight loss**

- Theory that the body has a set point of established weight and strongly attempts to maintain it
  - Thought to be regulated by the **Weight-regulating mechanism (WRM)** in the hypothalamus that controls how much the body should weigh
  - Dieting does not change the set point
    - **Basal metabolic rate (BMR)** is the lowest level of oxygen consumption necessary to sustain life
    - Research has shown changes in BMR to promote returning to a set-point and making weight loss difficult

The Physiology of Weight Loss

- Every person has a setpoint for calories and nutrients.
- Two healthy ways to lower set point
  - Exercise
  - Diet high in complex carbohydrates
- Two destructive ways to lower the set point that are more harmful to health than fat:
  - Nicotine
  - Amphetamines
Diet and Metabolism

- Basal metabolism (BMR) is related to lean body weight.
  - The more lean tissue, the higher the metabolic rate.
  - Frequent dieters lose more lean tissue as their metabolic rate slows down every time they are on a very low-calorie diet.
- Aging is not the main reason for the lower metabolic rate.

Diet and Metabolism

- Caloric restriction alone results in weight loss due to lean body mass and fat.
  - Diets with caloric intake less than 1500 calories cannot guarantee the retention of lean body mass.
  - Basal metabolism rate is related to lean body mass. Increased basal metabolism = higher BMR.
- Caloric restriction combined with exercise results in weight loss in the form of fat.

Two hormones appear to play a role in appetite

- Ghrelin
  - Produced in the stomach and stimulates appetite
- Leptin
  - Produced by fat cells and lets the brain know when you are full.
  - A lack of physical activity may create leptin resistance.
Sleep is important to weight management

- Key component to enhance health & extend life
  - Sleep deprivation appears to be conducive to weight gain.
  - Those with an average of less than 6 hours of sleep per day have a higher BMI than those averaging 8 hours per day.
- Lack of sleep disrupts normal hormone balance
  - Sleep deprivation elevates ghrelin, stimulating appetite.
  - Produced by fat cells, leptin leads to less desire to eat.
- Recommendation: Sleep 8 hours each night.

Exercise enhances weight loss while dieting

- To lose weight:
  - Combined strength and aerobic training is best
  - Aerobic training is the best modality to offset the set point
  - Strength training increases lean body mass and increases BMR
    - Each additional pound of muscle tissue raises the BMR about 35 calories per day
- To lose weight or maintain weight loss:
  - 60 – 90 minutes per day of moderate-intensity exercise is recommended
**Light-Intensity Vs. Vigorous-Intensity Exercise**

- A greater proportion of calories burned during low-intensity exercise are derived from fat.
- The lower the intensity of exercise, the higher the percentage of fat used as an energy source.
  - During low-intensity exercise, up to 50% of the calories burned may be from fat with the other 50% from glucose.
  - With intense exercise, only 30%-40% of the caloric expenditure comes from fat.
- Overall, twice as many calories can be burned during vigorous-intensity activity, and more fat.
- Metabolic rate remains at a slightly higher level longer after vigorous-intensity exercise, so you continue to burn calories after exercise.

**The best way to gain weight is to exercise**

- People who need to gain weight should focus on strength training.
- Strength training is the best way to gain weight as it increases lean body mass.
- Also increase caloric intake by 500 calories per day to build lean muscle.
  - Include 1.5 grams of protein per kg bodyweight in your diet.
  - Increase calories through eating complex carbohydrates.

**TABLE 9.3** Comparison of Approximate Energy Expenditure between 30–45 Minutes of Exercise at Three Intensity Levels

<table>
<thead>
<tr>
<th>Exercise Intensity</th>
<th>Total Energy Expenditure (Calories)</th>
<th>Percent Calories from Fat</th>
<th>Percent Calories from CHO*</th>
<th>Total CHO Calories</th>
<th>Calories Burned per Minute</th>
<th>Calories per Period per Minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Intensity</td>
<td>290</td>
<td>50%</td>
<td>50%</td>
<td>189</td>
<td>6.47</td>
<td>0.045</td>
</tr>
<tr>
<td>Moderate Intensity</td>
<td>290</td>
<td>40%</td>
<td>60%</td>
<td>169</td>
<td>9.43</td>
<td>0.063</td>
</tr>
<tr>
<td>Vigorous Intensity</td>
<td>400</td>
<td>30%</td>
<td>70%</td>
<td>290</td>
<td>13.58</td>
<td>0.098</td>
</tr>
</tbody>
</table>

*CHO = Carbohydrate
Weight loss myths

- **Cellulite**
  Term frequently used in reference to fat deposits that ‘bulge out,’ caused by herniation of subcutaneous fat within fibrous connective tissue and giving tissue a padded appearance.

- **Spot reducing**
  Fallacious theory proposing that exercise a specific body part results in significant fat reduction in that area.
  - Fat is lost throughout the entire body, not just the exercised area.
  - The greatest proportion of fat may come from the biggest fat deposits.
  - Wearing rubberized sweat suits not only hastens the rate of body fluid loss, it raises core temperature at the same time.

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Losing Weight the Sound and Sensible Way

- Research finds that a negative caloric balance is required to lose weight because:
  - People often underestimate their intake.
  - People have trouble changing and adjusting to new eating habits.
  - Many people take a long time to increase their activity level enough to offset the setpoint and burn enough calories to lose body fat.
  - Most successful dieters monitor their daily caloric intake.
  - A few people will not alter their food selection, so they must either increase physical activity, have a negative caloric balance, or both.
  - Finding your EER and caloric intake for weight loss (Lab 5A).

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Losing Weight the Sound and Sensible Way

- The exercise mode must safely match the body type and condition.
  - Weight-bearing exercises may cause injuries to joints and muscles.
  - Swimming may not be a good weight loss exercise because body fat makes a person more buoyant.
  - For successful weight loss, 60 to 90 minutes of physical activity on most days of the week is recommended.
  - Long-duration exercise allows fat to be burned more efficiently.
  - With aerobic training, the concentration of enzymes increases, so does the muscle’s ability to burn fat.
Losing Weight the Sound and Sensible Way

Many experts believe a person can take off weight more efficiently by reducing the amount of daily fat to about 20% of the total daily caloric intake.

- Fats are stored as fat more easily than carbohydrates are stored as fat.
- Make wise food choices.

<table>
<thead>
<tr>
<th>Table 4.5</th>
<th>Calorie Intakes for Selected Energy Intakes</th>
<th>% of Calories from Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,200</td>
<td>15 31 45</td>
<td></td>
</tr>
<tr>
<td>1,500</td>
<td>14 39 45</td>
<td></td>
</tr>
<tr>
<td>1,800</td>
<td>12 33 47</td>
<td></td>
</tr>
<tr>
<td>2,000</td>
<td>11 31 46</td>
<td></td>
</tr>
<tr>
<td>2,200</td>
<td>10 31 47</td>
<td></td>
</tr>
<tr>
<td>2,500</td>
<td>9 31 47</td>
<td></td>
</tr>
<tr>
<td>2,800</td>
<td>8 31 47</td>
<td></td>
</tr>
<tr>
<td>3,000</td>
<td>7 31 47</td>
<td></td>
</tr>
</tbody>
</table>

Making Wise Food Choices

- The time of day when food is consumed plays a part in weight reduction.
  - People who skip breakfast are hungrier later in the day and end up consuming more total daily calories than those who eat breakfast.
  - Regular breakfast eaters have less of a weight problem, lose weight more effectively, and have less difficulty maintaining weight loss.
  - The time of day when most of the fats and cholesterol are consumed can influence blood lipids and coronary heart disease.
  - Peak digestion time following a heavy meal is about 7 hours after that meal.
Monitoring your diet with daily food logs

- Those who keep a food log are more successful at maintaining weight loss
- Food diary with this text uses these allowances
  - Grains = 80 calories per serving
  - Fruits = 60 calories per serving of medium fruit
  - Vegetables = 25 calories per serving
  - Dairy (use low-fat products) = 120 calories per serving
  - Protein – use low-fat, 300 calories per serving frozen entrees or an equivalent amount if you prepare the food

The Simple Truth

- Weight management is accomplished by making a lifetime commitment to physical activity and proper food selection.
- The three most common reasons for relapsing into former behaviors are:
  - Stress-related factors (such as major life changes, depression, job changes, illness).
  - Social reasons (entertaining, eating out, business travel).
  - Self-enticing behaviors (placing yourself in a situation to see how much you can get away with).
- Making mistakes does not mean failure.
  - Failure is giving up.
  - Those persisting will reap the rewards!

Behavior modification

- Achieving and maintaining recommended body composition requires desire and commitment
- Tips to promote success
  - Surround yourself with people who have similar goals
  - Know that relapses are common – be persistent
  - Read Weight Loss Strategies – pages 184-186