

Chapter Summary

Alcohol is a source of energy and can be beneficial in reducing risk of heart disease and other chronic diseases when it is consumed in moderate amounts. Moderate alcohol intake is defined as 1 drink per day for women and 2 drinks per day for men. Many individuals should abstain completely. Alcohol is absorbed directly from the stomach, and some of it may be broken down prior to absorption.

The liver metabolizes alcohol at a rate of 1 drink per hour. While alcohol awaits metabolism, it circulates through the bloodstream and is distributed in all body fluids and tissues. There are two general types of alcohol use disorders: alcohol use and alcohol dependence, which is commonly known as alcoholism. Binge drinking is a form of alcohol abuse that has many negative consequences. Alcohol is a cellular toxin and a drug and, when consumed in excessive amounts, leads to hangover, reduced brain function, potentially fatal injuries, and alcohol poisoning. Chronic abuse results in liver damage, increased risk of chronic disease, malnutrition, and death from a number of causes. Alcohol abuse impairs food intake, digestion, absorption, transport, activation, and excretion of nutrients. Women who consume alcohol before or during pregnancy affect the brain development of the child. Alcohol passes readily through breast milk and also has negative effects on the infant.

There are a number of ways for college students to take control of their drinking. Students who are concerned about their alcohol intake can answer a list of questions from the National Institute of Alcohol Abuse and Alcoholism and should seek help immediately if they do have a problem. Family and friends can influence a person needing help by confronting the individual and supporting treatment.

Learning Objectives

After studying this chapter, the student should be able to:

1. Describe two potential benefits and two potential concerns related to “moderate drinking,” (pp. 153–155).
2. Explain how the body metabolizes alcohol, (pp. 155–156).
3. Distinguish between alcohol abuse and alcohol dependence, (p. 156).
4. List four dangerous consequences of binge drinking among young Americans, (pp. 156–159).
5. Discuss the risks of maternal alcohol consumption during fetal development, (pp. 160–161).
6. Identify at least three strategies for limiting your drinking and three signs of an alcohol problem, (pp. 160–162).

7. Discuss how to help a loved one with an alcohol problem, (p. 162).

Key Terms

alcohol	cirrhosis of the liver	moderate drinking
alcohol abuse	drink	proof
alcohol dependence	ethanol	resveratrol
alcohol hangover	fatty liver	teratogen
alcohol poisoning	fetal alcohol spectrum	
alcoholic hepatitis	disorders	
binge drinking	fetal alcohol syndrome	

Chapter Outline

I. What Do We Know About Moderate Alcohol Intake?

- A. Alcohol, specifically ethanol, is a chemical compound similar to carbohydrate with one hydroxyl group.
- B. Alcohol consumption is described in terms of the number of drinks per day.
 - 1. An alcoholic drink is defined as the amount of beverage that provides 0.5 fluid ounces of pure alcohol.
 - 2. Alcoholic beverages vary in ethanol content.
 - a. Proof is the measure of alcohol content in distilled spirits; the percent alcohol is half of the proof.
 - 3. Moderate intake has been defined by the Dietary Guidelines for Americans and is based on maximal daily intake.
 - a. For the average adult female, no more than 1 drink per day is moderate.
 - b. Moderate for the average adult male is no more than 2 drinks per day.
 - 4. Some people should not consume alcohol at all.
 - a. Alcohol is not recommended for pregnant or breastfeeding women, those with a history of alcoholism, those under the legal drinking age, and those on certain medications.
- C. Moderate intake of alcohol has some health benefits.
 - 1. Moderate consumption reduces stress and anxiety while improving self-confidence and appetite.
 - 2. It may also improve appetite and dietary intake, which can help the elderly and those with chronic diseases that suppress appetite.
 - 3. Moderate alcohol consumption may reduce the risk of age-related cognitive decline, lower rates of heart disease, increase HDL, decrease LDL, and decrease clot formation.
 - 4. Resveratrol, a phytochemical in red wine, has shown benefits in animal studies for lowering risk of chronic disease, but the amount in red wine is too minimal to provide a health benefit.
- D. Moderate alcohol intake creates concerns for some individuals.
 - 1. Alcohol may increase risk of breast cancer in some women.

2. Risks of hypertension and hemorrhagic strokes have been shown to rise with moderate alcohol consumption in certain individuals.
3. Alcohol contains empty Calories and can enhance your appetite, leading to possible weight gain.
4. Drug-alcohol interactions are common, dangerous, and may be fatal.

Key Terms: alcohol, ethanol, drink, proof, moderate drinking, resveratrol

Figures:

Figure 1: Chemical structures of glycerol and alcohol (ethanol).

Figure 2: What does one drink look like?

Figure 3: Going out for a few drinks?

II. How Is Alcohol Metabolized?

- A. Alcohol requires no digestion and is absorbed by the stomach and small intestine.
 1. Consuming food with protein, fat, and fiber slows absorption and reduces blood alcohol concentration (BAC) by as much as 50% compared to drinking on an empty stomach.
 2. Carbonated alcoholic beverages are absorbed faster.
- B. The rate of alcohol absorption depends on many factors (see chapter 7 for details).
- C. The first step in alcohol degradation is the release of alcohol dehydrogenase (ADH) by cells in the stomach and liver.
 1. Aldehyde dehydrogenase (ALDH) takes the breakdown process one step further.
 2. Women have decreased ADH activity, leaving 30–35% more alcohol for absorption than men.
- D. Once absorbed, the alcohol moves through the bloodstream to the liver where it is broken down.
 1. Alcohol is metabolized at a rate of about 1 drink per hour in healthy adults.
 2. Alcohol awaiting metabolism is distributed equally in body fluids and tissue spaces, including the brain.
 3. There are no practical interventions that will speed up alcohol metabolism.
 4. Drinking while eating a meal or snack, drinking no more than 1 drink per hour, and limiting total alcohol consumption are the keys to keeping BAC within the legal limit.
- E. If a person slowly increases consumption, over time the liver becomes more efficient at metabolizing alcohol.
 1. Over time abusers experience metabolic tolerance, and BAC rises more slowly.
 2. Chronic alcohol consumers experience functional tolerance; despite high BAC, they show no signs of impairment.

Nutrition Animation: Alcohol Absorption (located in IR-DVD folder)

Figure and Table:

Figure 4: Metabolism of alcohol.

Table 1: Myths about Alcohol Metabolism

III. What Are Alcohol Use and Dependence?

- A. There are two types of alcohol use disorders:

1. Alcohol abuse, whether chronic or occasional, is a pattern of alcohol consumption that results in distress, danger, harm to one's health, functioning, or interpersonal relationships.
 - a. Binge drinking is a form of alcohol abuse that is defined as the consumption of 5 or more drinks in one occasion for a man, or four or more drinks for a woman.
 - i. There are many negative consequences to binge drinking including increased risk of potentially fatal accidents, violence, and hangovers.
2. Alcohol dependence (commonly known as alcoholism) is characterized by craving, loss of control, physical dependence, and tolerance.

Key Terms: alcohol abuse, binge drinking, alcohol dependence

IV. What Are the Effects of Alcohol Abuse?

- A. Alcohol is a drug that depresses brain activity and acts as a direct toxin.
- B. Alcohol increases the risk of mortality dramatically when consumed in excess.
- C. Alcohol hangover lasts for up to 24 hours with a multitude of unpleasant symptoms.
 1. The diuretic effect results in dizziness and lightheadedness.
 2. By irritating the lining of the stomach and increasing gastric acid, alcohol causes many gastrointestinal symptoms.
 3. Alcohol lowers blood sugar, raises lactic acid, and affects biological rhythms, resulting in fatigue, weakness, mood changes.
 4. Alcohol disrupts various biological rhythms, such as sleep patterns and hormone secretions, leading to an effect similar to jet lag.
 5. Hangover prevention and remedies have no proof of effectiveness, but the symptoms can be treated and reduced.
- D. Alcohol reduces brain function.
 1. Alcohol alters behavior, reasoning, judgment, and fine and gross motor skills.
 2. Alcohol may cause severe mood swings in either direction.
 3. In adolescents and young adults, chronic consumption inhibits intellect, impairs memory, and increases risk of addiction.
- E. Alcohol poisoning is a metabolic response to binge drinking.
 1. At high BACs, less oxygen reaches the brain, and respiratory or cardiac failure may occur.
 2. Most people lose consciousness before alcohol poisoning becomes fatal.
 - a. After heavy drinking, an individual should be placed on one's side and watched.
 - b. Cold, clammy skin, bluish skin, and slow irregular heartbeat are signs of alcohol poisoning that require immediate medical attention.
- F. Chronic alcohol abuse damages the liver.
 1. Fatty liver, the first stage of liver damage, occurs when metabolic changes result in an accumulation of fat in the liver cells, which can be reversed.
 2. Alcoholic hepatitis, from which a person may or may not recover, increases malnutrition and decreases immune function.
 3. Cirrhosis, the result of chronic abuse, damages the liver irreversibly and may lead to liver failure.

G. Chronically high intakes of alcohol can negatively affect bone health and increase risk of diabetes, pancreatic injury, and cancer.

H. Alcohol abuse leads to malnutrition.

1. Malnutrition occurs when alcohol displaces more than 30% of total calories, resulting in inadequate nutrient intake.
2. The toxic effects of alcohol lead to impaired food digestion, nutrient absorption, and nutrient metabolism.
 - a. Alcohol impairs function of the stomach, small intestine, pancreas, and liver, reducing digestive enzyme production.
 - b. Alcohol impairs absorption of vitamins and interferes with activation and transport of many vitamins.

I. Excessive alcohol intake increases the risk for traumatic injury.

1. It is the third leading preventable, lifestyle-related cause of death for Americans of all ages.

J. No level of alcohol consumption is considered safe for pregnant women.

1. Alcohol is a teratogen that readily crosses the placenta into the fetal bloodstream.
2. Fetal alcohol syndrome (FAS) is the most severe consequence of maternal alcohol consumption.
3. Other conditions associated with maternal alcohol consumption are collectively known as fetal alcohol spectrum disorders (FASD).
4. Women who are breastfeeding should also abstain from alcohol because it easily passes into breast milk.

Key Terms: alcohol hangover, alcohol poisoning, fatty liver, alcoholic hepatitis, cirrhosis of the liver, teratogen, fetal alcohol syndrome (FAS), fetal alcohol spectrum disorder (FASD)

Figures:

Figure 5: The effect of alcohol consumption on mortality risk.

Figure 6: Effects of increasing blood alcohol concentration on brain function.

Figure 7: Cirrhosis of the liver is often caused by chronic alcohol abuse.

Figure 8: Alcohol-related malnutrition.

Figure 9: A child with fetal alcohol syndrome (FAS).

V. Taking Control of Your Alcohol Intake

A. Strategies to avoid the negative health consequences of excessive alcohol consumption include:

1. Try using healthy stress-reduction techniques rather than drinking to release stress.
2. Eat a protein-containing meal or snack before drinking, more of the alcohol will be broken down in the stomach, reducing what is absorbed into the bloodstream.
3. Rotate between alcoholic and non-alcoholic beverages, dilute hard liquor with large amounts of other beverages to reduce alcohol and calories, and sip slowly.
4. Volunteer to be the designated driver to eliminate pressure to drink.
5. Plan in advance the amount you will drink, and create strategies to stick to your limit.

B. If you have trouble keeping your drinking moderate, you should be concerned about your alcohol intake.

- C. The National Institute on Alcohol Abuse and Alcoholism (NIAA) provides a list of questions for you to determine whether you may have a drinking problem.
- D. If you think that you have a problem, seeking help is important, and your campus may provide such services.

VII. Talking to Someone about Alcohol Addiction

- A. A variety of behaviors may indicate that a close friend or relative may have a serious alcohol problem.
- B. The first step toward recovery is accepting that help is needed. Confrontation and the support of family and friends is difficult but effective.
 - 1. Do not cover up or make excuses for the abuser.
 - 2. Take action when the person is vulnerable but sober.
 - 3. Give specific explanations and examples to support your concern.
 - 4. Get professional support immediately to avoid a change of heart.
 - 5. Enlist support of other close relatives and friends whether or not the person agrees to treatment.
- C. Treatment is not always successful but is measured in small steps with possible set-backs.

Activities

- 1. Prior to the discussion of this chapter, ask students to talk to friends about consuming alcohol to determine popular perceptions. They might ask questions about personal drinking habits, beliefs about drinking habits of students, benefits and consequences of drinking, why students drink, and ways they believe the common effects can be remedied. An important question to ask is how athletes perceive the effects of alcohol on athletic performance. Students can then generate a list of common perceptions about alcohol and compare them to Table 1, Myths About Alcohol Metabolism, found in their textbook. For perceptions that are not on the list or in the chapter, students may need to investigate to sort out the myths.
- 2. You can most likely obtain information from your Student Services administrators on alcohol consumption on your campus (most schools survey students yearly). At the beginning of class, survey the class to determine their perceptions about drinking on their campus. Ask what percentage of students they believe consume alcohol, underage drink, binge, and so on. Then present the actual statistics.
- 3. A&E presents a TV program titled *Intervention*, which offers dramatic representations of ways that families and friends have intervened in the lives of those who suffer from drug and alcohol addiction. One of the programs would make a good introduction to the topic and can be viewed at: www.aetv.com/intervention. You may want to obtain information from Student Services on what help is available through your institution.

Diet Analysis Activity

- 4. College Drinking Prevention (see Web Resources, below) offers an alcohol Calorie counter, an alcohol cost calculator, and a BAC calculator. Students can determine how various alcoholic beverages affect their Caloric intake and their budget. The BAC

calculator can be used hypothetically to learn about the effects of various drinks in varying amounts. It does not, however, take gender into consideration, and this might be discussed in class.

Nutrition Debate Activity

5. Bring the alcohol policies of your institution to class. Divide students into groups to review the policies next to the statistics on alcohol use on your campus (see Activity 2, above). Have students debate the merits and shortcomings of the policies. Ask groups to discuss their prior knowledge of these policies and whether the information is disseminated effectively.

Web Resources

Alcoholics Anonymous, Inc.

www.aa.org

Al-Anon Family Group Headquarters, Inc.

www.al-anon.alateen.org

National Institute on Alcohol Abuse and Alcoholism

www.niaaa.nih.gov

College Drinking: Changing the Culture

www.collegedrinkingprevention.gov
