

Substance Use and Addictive Disorder

Category: 1 Depressants

Depressants slow the activity of the central nervous system. They reduce tension and inhibitions and may interfere with a person's judgment, motor activity, and concentration. The three most widely used groups of depressants are *alcohol*, *sedative-hypnotic drugs*, and *opioids*.

1. Alcohol

The World Health Organization estimates that 2 billion people worldwide consume **alcohol**. In the United States more than half of all residents at least from time to time drink beverages that contain alcohol (NSDUH, 2013). Purchases of beer, wine, and liquor amount to tens of billions of dollars each year in the United States alone.

When people consume five or more drinks on a single occasion, it is called a *binge drinking* episode. Twenty-three percent of people in the United States over the age of 11, most of them male, binge drink each month (NSDUH, 2013). Around 6.5 percent of people over 11 years of age binge drink at least five times each month (NSDUH, 2013). They are considered heavy drinkers. Among heavy drinkers, males outnumber females by at least 3 to 2.

At first ethyl alcohol depresses the areas of the brain **that control judgment and inhibition; people become looser, more talkative, and often more friendly**. As their inner control breaks down, they may feel relaxed, confident, and happy. When more alcohol is absorbed, it slows down additional areas in the central nervous system, leaving the drinkers less able to make sound judgments, their speech less careful and less coherent, and their memory weaker. Many people become highly emotional and perhaps loud and aggressive.

Motor difficulties increase as a person continues drinking, and reaction times slow. People may be unsteady when they stand or walk and clumsy in performing even simple activities. They may drop things, bump into doors and furniture, and misjudge distances. Their vision becomes blurred, particularly their peripheral, or side, vision, and they have trouble hearing. As a result, people who have drunk too much alcohol may have great difficulty driving or solving simple problems.

Gender also affects the concentration of alcohol in the blood. Women have less of the stomach enzyme *alcohol dehydrogenase* which breaks down alcohol in the stomach before it enters the blood. So women become more intoxicated than men on equal doses of alcohol, and women may be at greater risk for physical and psychological damage from alcohol than men who drink similar quantities of alcohol (Hart & Ksir, 2014). Levels of impairment are closely related to the concentration of ethyl alcohol in the blood.

The effects of alcohol subside only when the alcohol concentration in the blood declines. Most of the alcohol is broken down, or *metabolized*, by the liver into carbon dioxide and water, which can be exhaled and excreted. Drinking black coffee, splashing cold water on one's face, or "pulling oneself together" cannot hurry the process.

Alcohol Use Disorder It is one of the most dangerous of recreational drugs, and its reach extends across the life span. Alcohol misuse is also a major problem on college campuses. Surveys indicate that over a 1-year period, 6.8 percent of all adults in the United States display *alcohol use disorder*, known in popular terms as *alcoholism* (NSDUH, 2013). Men with this disorder outnumber women by at least 2 to 1. Many teenagers also experience the disorder (Johnston et al., 2014). The current prevalence of alcoholism is around 7.6 percent for white Americans, 5.1 percent for Hispanic Americans, and 4.5 percent for African Americans (NSDUH, 2013). As many as half of these individuals have a deficiency of alcohol dehydrogenase, the chemical responsible for breaking down alcohol, so they react quite negatively to even a modest intake of alcohol.

Generally speaking, people with alcohol use disorder drink large amounts regularly and rely on it to enable them to do things that would otherwise make them anxious (McGrady, 2014). Eventually the drinking interferes with their social behavior and ability to think and work. They may have frequent arguments with family members or friends, miss work repeatedly, and even lose their jobs. MRI scans of chronic heavy drinkers have revealed damage in various regions of their brains and, correspondingly, impairments in their memory, speed of thinking, attention skills, and balance (Sifferlin, 2014; Hernandez-Avila & Kranzler, 2011).

Individually, people's patterns of alcoholism vary. Some drink large amounts of alcohol every day and keep drinking until intoxicated. Others go on periodic binges of heavy drinking that can last weeks or months. They may remain intoxicated for days and later be unable to remember anything about the period. Still others may limit their excessive drinking to weekends, evenings, or both.

TOLERANCE AND WITHDRAWAL: for many people, alcohol use disorder includes the symptoms of tolerance and withdrawal reactions (McCrady, 2014). As their bodies build up a tolerance for alcohol, they need to drink ever larger amounts to feel its effects. In addition, they have withdrawal symptoms when they stop drinking. Within hours their hands, tongue, and eyelids begin to shake; they feel weak and nauseated; they sweat and vomit; their heart beats rapidly; and their blood pressure rises. They may also become anxious, depressed, unable to sleep, or irritable (APA, 2013).

A small percentage of people with alcohol use disorder go through a particularly dramatic withdrawal reaction called **delirium tremens ("the DTs")**. It consists of terrifying visual hallucinations that begin within three days after they stop or reduce their drinking. Some people see small, frightening animals chasing or crawling on them or objects dancing about in front of their eyes. Mark Twain gave a classic picture of delirium tremens in Huckleberry Finn's description of his father like most other alcohol withdrawal symptoms, the DTs usually run their course in 2 to 3 days. *However, people who have severe withdrawal reactions such as this may also have seizures, lose consciousness, suffer a stroke, or even die. Today certain medical procedures can help prevent or reduce such extreme reactions.*

[What Are the Personal and Social Impacts of Alcoholism?](#)

Alcoholism destroys millions of families, social relationships, and careers (Hernandez-Avila & Kranzler, 2011)

The disorder also plays a role in more than one-third of all suicides, homicides, assaults, rapes, and accidental deaths, including 30 percent of all fatal automobile accidents in the United States (Gifford et al., 2010). Altogether, intoxicated drivers are responsible for 12,000 deaths each year. More than 11 percent of all adults have driven while intoxicated at least once in the past year

(NSDUH, 2013). Although this is a frightening number, it represents a significant drop since 2002 when 14 percent of adults had driven in an intoxicated state.

Alcoholism has serious effects on the 30 million children of people with this disorder. Home life for these children is likely to include much conflict and perhaps sexual or other forms of abuse. In turn, the children themselves have higher rates of psychological problems (Kelley et al., 2014; Buu et al., 2012; Watt, 2002). Many have low self-esteem, poor communication skills, poor sociability, and marital problems.

Long-term excessive drinking can also seriously damage a person's physical health (Hernandez-Avila & Kranzler, 2011; Nace, 2011, 2005). It so overworks the liver that people may develop an irreversible condition called **cirrhosis, in which the liver becomes scarred and dysfunctional**. Cirrhosis accounts for more than 32,000 deaths each year (CDC, 2013). Alcohol use disorder may also damage the heart and lower the immune system's ability to fight off cancer, bacterial infections, and AIDS.

Long-term excessive drinking also causes major nutritional problems. Alcohol makes people feel full and lowers their desire for food, yet it has no nutritional value. As a result, chronic drinkers become malnourished, weak, and prone to disease. Their vitamin and mineral deficiencies may also cause problems. **An alcohol-related deficiency of vitamin B (thiamine), for example, may lead to Korsakoff's syndrome, a disease marked by extreme confusion, memory loss, and other neurological symptoms** (Hernandez-Avila & Kranzler, 2011; Nace, 2011, 2005). People with Korsakoff's syndrome cannot remember the past or learn new information and may make up for their memory losses by confabulating—reciting made-up events to fill in the gaps.

Women who drink during pregnancy place their fetuses at risk (Bakoyiannis et al, 2014; Hart & Ksir, 2014; Gifford et al., 2010). Excessive alcohol use during pregnancy may cause a baby to be born with fetal alcohol syndrome, a pattern of abnormalities that can include intellectual disability disorder, hyperactivity, head and face deformities, heart defects, and slow growth. It has been estimated that in the overall population, around 1 of every 1,000 babies is born with this syndrome. The rate may increase to as many as 29 of every 1,000 babies of women who are problem drinkers.

If all alcohol-related birth defects (known as fetal alcohol spectrum disorder) are counted, the rate becomes 80 to 200 such births per 1,000 heavy-drinking women. In addition, heavy drinking early in pregnancy often leads to a miscarriage.

2. Sedative-Hypnotic Drugs

Sedative-hypnotic drugs, also called **anxiolytic** (meaning “anxiety-reducing”) **drugs**, produce feelings of relaxation and drowsiness. At low dosages, the drugs have a calming or sedative effect. At higher dosages, they are sleep inducers, or hypnotics.

The sedative-hypnotic drugs include *barbiturates* and *benzodiazepines*.

3. Barbiturates

Barbiturates were widely prescribed in the first half of the twentieth century to fight anxiety and to help people sleep. Although still prescribed by some physicians, these drugs have been largely replaced by benzodiazepines, which are generally safer drugs. Barbiturates can cause many problems, not the least of which is misuse. Several thousand deaths a year are caused by accidental or suicidal overdoses.

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Barbiturates are usually taken in pill or capsule form. In low doses they reduce a person’s level of excitement in the same way that alcohol does, by attaching to receptors on the neurons that receive the inhibitory neurotransmitter GABA and by helping GABA operate at those neurons (Filip et al., 2014; Hart & Ksir, 2014). People can become intoxicated from large doses of barbiturates, just as they do from alcohol. And, like alcohol, barbiturates are broken down in the liver. At too high a level, the drugs can halt breathing, lower blood pressure, and lead to coma and death. Repeated use of barbiturates can quickly result in *sedative-hypnotic use disorder*

Users may spend much of the day intoxicated, irritable, and unable to do their work. Some organize their lives around the drug and need increasing amounts of it to calm down or fall asleep. A major danger of barbiturate tolerance is that the lethal dose of the drug remains the same even while the body is building up a tolerance for its sedating effects. Once the prescribed dose stops reducing anxiety or inducing sleep, the user is all too likely to increase it without medical supervision and eventually may ingest a dose that proves fatal. The person may also have withdrawal symptoms such as nausea, anxiety, and sleep problems. Barbiturate withdrawal is particularly dangerous because it can cause convulsions.



4. Benzodiazepines

The antianxiety drugs developed in the 1950s, as the most popular sedative-hypnotic drugs available. Xanax, Ativan, and Valium are just three of the dozens of these compounds in clinical use. Like alcohol and barbiturates, they calm people by binding to receptors on the neurons that receive GABA and by increasing GABA's activity at those neurons (Filip et al., 2014; Dupont & Dupont, 2011, 2005).

These drugs, however, relieve anxiety without making people as drowsy as other kinds of sedative-hypnotics. They are also less likely to slow a person's breathing, so they are less likely to cause death in the event of an overdose.

When benzodiazepines were first discovered, they seemed so safe and effective that physicians prescribed them generously, and their use spread. Eventually **it became clear that in high enough doses the drugs can cause intoxication and lead to an addictive pattern of use.**

5. Opioids

Opioids include opium—taken from the sap of the opium poppy—and the drugs derived from it, such as heroin, morphine, and codeine. **Opium** itself has been in use for thousands of years. In the past it was used widely in the treatment of medical disorders because of its ability to reduce both physical and emotional pain.

Eventually, however, physicians discovered that the drug was addictive. In 1804 a new substance, **morphine**, was derived from opium. Named after Morpheus, the Greek god of sleep, this drug relieved pain even better than opium did and initially was considered safe. However, wide use of the drug eventually revealed that it, too, could lead to addiction. So many wounded soldiers in the United States received morphine injections during the Civil War that morphine addiction became known as “soldiers’ disease.

In 1898, morphine was converted into yet another new pain reliever, **heroin**. For several years heroin was viewed as a wonder drug and was used as a cough medicine and for other medical purposes. Eventually, however, physicians learned that heroin is even more addictive than the other opioids

Still other drugs have been derived from opium, and *synthetic* (laboratory- blended) opioids such as *methadone* have also been developed (Dilts & Dilts, 2011, 2005). **All these opioid drugs—natural and synthetic—are known collectively as *narcotics*.** Each drug has a different strength, speed of action, and tolerance level. Morphine, *codeine*, and *oxycodone* (the key ingredient in OxyContin and Percocet) are medical narcotics usually prescribed to relieve pain. In contrast to these narcotics, heroin is illegal in the United States in all circumstances.

Most narcotics are smoked, inhaled, snorted, injected by needle just beneath the skin (“skin popped”), or injected directly into the bloodstream (“mainlined”). Injection seems to be the most common method of narcotic use, although the other techniques have been used increasingly in recent years (NSDUH, 2013). An injection quickly brings on a

rush—a spasm of warmth and ecstasy that is sometimes compared with orgasm. The brief spasm is followed by several hours of a pleasant feeling called a *high* or *nod*. During a high, the drug user feels relaxed, happy, and unconcerned about food, sex, or other bodily needs.

Opioids create these effects by depressing the central nervous system, particularly the centers that help control emotion. The drugs attach to brain receptor sites that ordinarily receive **endorphins**—neurotransmitters that help relieve pain and reduce emotional tension (Hart & Ksir, 2014; Epstein, Phillips, & Preston, 2011). When neurons at these receptor sites receive opioids, they produce pleasurable and calming feelings just as they would do if they were receiving endorphins. **In addition to reducing pain and tension, opioids cause nausea, narrowing of the pupils (“pinpoint pupils”), and constipation—bodily reactions that can also be brought about by releases of endorphins in the brain.**

Heroin use exemplifies the kinds of problems posed by opioids. After taking heroin repeatedly for just a few weeks, users may develop *opioid use disorder*. Their use of heroin interferes significantly with their social and occupational functioning, and their lives center around the drug. They may also build a tolerance for heroin and experience a withdrawal reaction when they stop taking it (Hart & Ksir, 2014; Ahmed, 2011). At first the withdrawal symptoms are anxiety, restlessness, sweating, and rapid breathing; later they include severe twitching, aches, fever, vomiting, diarrhea, loss of appetite, high blood pressure, and weightloss of up to 15 pounds (due to loss of bodily fluids). These symptoms usually peak by the third day, gradually subside, and disappear by the eighth day. A person in heroin withdrawal can either wait out the symptoms or end withdrawal by taking the drug again.

Such people soon need heroin just to avoid going into withdrawal, and they must continually increase their doses in order to achieve even that relief. The temporary high becomes less intense and less important. Heroin users may spend much of their time planning their next dose, in many cases turning to criminal activities, such as theft and prostitution, to support the expensive “habit” (Cadet, Bisagno, & Milroy, 2014; Koetzle, 2014).

What Are the Dangers of Opioid Use?

Once again, heroin provides a good example of the dangers of opioid use. The most immediate

danger of heroin use is an **overdose**, which closes down the respiratory center in the brain, almost paralyzing breathing and in many cases causing death (Christensen, 2014). Death is particularly likely during sleep, when a person is unable to fight this effect by consciously working to breathe. People who resume heroin use after having avoided it for some time often



make the fatal mistake of taking the same dose they had built up to before. Because their bodies have been without heroin for some time, however, they can no longer tolerate this high level. There has been a 50 percent increase in the number of deaths caused by heroin overdoses in the past decade (Gray, 2014). Each year approximately 2 percent of those addicted to heroin and other opioids die under the drug's influence, usually from an overdose.

Heroin users run other risks as well. Drug dealers often mix heroin with a cheaper drug or even a deadly substance such as cyanide or battery acid. In addition, dirty needles and other unsterilized equipment spread infections such as AIDS, hepatitis C, and skin abscesses (Dilts & Dilts, 2011, 2005). In some areas of the United States, the HIV infection rate among active heroin users is reported to be as high as 60 percent.