NIDA NATIONAL INSTITUTE ON DRUG ABUSE 30 Years 1974-2004

Prescription Drugs and Pain Medications

Prescription drugs make complex surgery possible, relieve pain for millions of people, and enable many individuals with chronic medical conditions to control their symptoms and lead productive lives. Most people who take prescription medications use them responsibly. However, the non-medical use of prescription drugs is a serious public health concern. Nonmedical use of prescription drugs like opioids, central nervous system (CNS) depressants, and stimulants can lead to abuse and addiction, characterized by compulsive drug seeking and use.

Addiction rarely occurs among people who use a pain reliever, CNS depressant, or stimulant as prescribed; however, inappropriate use of prescription drugs can lead to addiction in some cases. Patients, healthcare professionals, and pharmacists all have roles in preventing misuse and addiction. For example, if a doctor prescribes a pain medication, CNS depressant, or stimulant, the patient should follow the directions for use carefully, and also learn what effects the drug could have and potential interactions with other drugs by reading all information provided by the pharmacist. Physicians and other health care providers should screen for any type of substance abuse during routine history-taking with questions about what prescriptions and over-the-counter medicines the patient is taking and why.

Trends in Prescription Drug Abuse

In 1999, an estimated 4 million people, about 2 percent of the population age 12 and older, were currently (use in past month) using prescription drugs non-medically. Of these, 2.6 million misused pain relievers, 1.3 million misused sedatives and tranquilizers, and 0.9 million misused stimulants.1 While prescription drug abuse affects many Americans, some trends of particular concern can be seen among older adults, adolescents, and women.

The misuse of prescribed medications may be the most common form of drug abuse among the elderly. Older people are prescribed medications about three times more frequently than the general population, and have poorer compliance with directions for use.

The National Household Survey on Drug Abuse1 numbers indicate that the sharpest increases in new users of prescription drugs for non-medical purposes occur in 12 to 17 and 18 to 25 year-olds. Among 12 to 14 year-olds, psychotherapeutics (e.g., pain killers, tranquilizers, sedatives, and stimulants) were reported to be one of two primary drugs used.

The 1999 Monitoring the Future Survey2 of 8th, 10th, and 12th graders nationwide, showed that for barbiturates, tranquilizers, and narcotics other than heroin, general long-term declines in use in the 1980s leveled-off in the early 1990s, with modest increases again in the mid-1990s.

Overall, men and women have roughly similar rates of nonmedical use of prescription drugs, with the exception of 12 to 17 year olds. In this age group, young women are more likely than young men to use psychotherapeutic drugs nonmedically. Also, among women and men who use either a sedative, anti-anxiety drug, or hypnotic, women are almost twice as likely to become addicted.3

The Drug Abuse Warning Network,4 which collects data on drug-related hospital emergency room episodes, reported that mentions of hydrocodone as a cause for visiting an emergency room increased 37 percent among all age groups from 1997 to 1999. Also, mentions of clonazepam increased 102 percent since 1992.

Commonly Abused Prescription Drugs

While many prescription drugs can be abused or misused, these three classes are most commonly abused:
Opioids - often prescribed to treat pain.
CNS Depressants - used to treat anxiety and sleep disorders.
Stimulants - prescribed to treat narcolepsy and attention deficit/hyperactivity disorder.

Opioids

Opioids are commonly prescribed because of their effective analgesic or pain relieving properties. Many studies have shown that properly managed medical use of opioid analgesic drugs is safe and rarely causes clinical addiction, which is defined as compulsive, often uncontrollable use. Taken exactly as prescribed, opioids can be used to manage pain effectively.
Among the drugs that fall within this class - sometimes referred to as narcotics - are morphine, codeine, and related drugs. Morphine is often used before or after surgery to alleviate severe pain. Codeine is used for milder pain. Other examples of opioids that can be prescribed to alleviate pain include oxycodone (OxyContin-an oral, controlled release form of the drug); propoxyphene (Darvon); hydrocodone (Vicodin); hydromorphone (Dilaudid); and meperidine (Demerol), which is used less often because of its side effects. In addition to their effective pain relieving properties, some of these drugs can be used to relieve severe diarrhea (Lomotil, for example, which is diphenoxylate) or severe coughs (codeine).

Opioids act by attaching to specific proteins called opioid receptors, which are found in the brain, spinal cord, and gastrointestinal tract. When these drugs attach to certain opioid receptors in the brain and spinal cord they can effectively block the transmission of pain messages to the brain.

In addition to relieving pain, opioid drugs can affect regions of the brain that mediate what we perceive as pleasure, resulting in the initial euphoria that many opioids produce. They can also produce drowsiness, cause constipation, and, depending upon the amount of drug taken, depress breathing. Taking a large single dose could cause severe respiratory depression or be fatal.

Opioids may interact with other drugs and are only safe to use with other drugs under a physician's supervision. Typically, they should not be used with substances such as alcohol, antihistamines, barbiturates, or benzodiazepines. These drugs slow down breathing, and their combined effects could risk life-threatening respiratory depression.
Chronic use of opioids can result in tolerance to the drugs so that higher doses must be taken to obtain the same initial effects. Long-term use also can lead to physical dependence - the body adapts to the presence of the drug and withdrawal symptoms occur if use is reduced abruptly.

Symptoms of withdrawal can include restlessness, muscle and bone pain, insomnia, diarrhea, vomiting, cold flashes with goose bumps ("cold turkey"), and involuntary leg movements.

Options for effectively treating addiction to prescription opioids are drawn from experience and research on treating heroin addiction. Some examples follow.

Methadone, a synthetic opioid that blocks the effects of heroin and other opioids, eliminates withdrawal symptoms, and relieves drug craving. It has been used for over 30 years to successfully treat people addicted to opioids.

Other medications include LAAM (levo-alpha-acetyl-methadol), an alternative to methadone that blocks the effects of opioids for up to 72 hours. Naltrexone is a long acting opioid blocker often used with highly motivated individuals in treatment programs promoting complete abstinence, and also to prevent relapse.

Buprenorphine, another synthetic opioid, will soon be available. Also, naloxone counteracts the effects of opioids and is used to treat overdoses.

CNS Depressants

CNS depressants slow down normal brain function. In higher doses, some CNS depressants can become general anesthetics.

CNS depressants can be divided into two groups, based on their chemistry and pharmacology: Barbiturates, such as mephobarbital (Mebaral) and pentobarbital sodium (Nembutal), which are used to treat anxiety, tension, and sleep disorders.

Benzodiazepines, such as diazepam (Valium), chlordiazepoxide HCl (Librium), and alprazolam (Xanax), which can be prescribed to treat anxiety, acute stress reactions, and panic attacks. Benzodiazepines that have a more sedating effect, such as triazolam (Halcion) and estazolam (ProSom) can be prescriped for short-term treatment of sleep disorders.

There are many CNS depressants, and most act on the brain similarly - they affect the neurotransmitter gamma-aminobutyric acid (GABA). Neurotransmitters are brain chemicals that facilitate communication between brain cells. GABA works by decreasing brain activity. Although different classes of CNS depressants work in unique ways, ultimately it is their ability to increase GABA activity that produces a drowsy or calming effect. Despite these beneficial effects for people suffering from anxiety or sleeping disorders, barbiturates and benzodiazepines can be addictive and should be used only as prescribed.

CNS depressants should not be combined with any medication or substance that causes sleepiness, including prescription pain medicines, certain over-the-counter cold and allergy medications, or alcohol. The effects of the drugs can combine to slow breathing, or slow both the heart and respiration, which can be fatal.

Discontinuing prolonged use of high doses of CNS depressants can lead to withdrawal. Because they work by slowing the brain's activity, a potential consequence of abuse is that when one stops taking a CNS depressant the brain's activity can rebound to the point that seizures can occur. Someone thinking about ending their use of a CNS depressant, or who has stopped and is suffering withdrawal, should speak with a physician and seek medical treatment.

In addition to medical supervision, counseling in an in-patient or out-patient setting can help people who are overcoming addiction to CNS depressants. For example, cognitive-behavioral therapy has been used successfully to help individuals in treatment for abuse of benzodiazepines. This type of therapy focuses on modifying a patient's thinking, expectations, and behaviors while simultaneously increasing their skills for coping with various life stressors.

Often the abuse of CNS depressants occurs in conjunction with the abuse of another substance or drug, such as alcohol or cocaine. In these cases of polydrug abuse, the treatment approach needs to address the multiple addictions.

Stimulants

Stimulants are a class of drugs that enhance brain activity - they cause an increase in alertness, attention, and energy that is accompanied by increases in blood pressure, heart rate, and respiration.

Historically, stimulants were used to treat asthma and other respiratory problems, obesity, neurological disorders, and a variety of other ailments. As their potential for abuse and addiction became apparent, the use of stimulants began to wane. Now, stimulants are prescribed for treating only a few health conditions, including narcolepsy, attention-deficit hyperactivity disorder (ADHD), and depression that has not responded to other treatments. Stimulants may also be used for short-term treatment of obesity, and for patients with asthma.

Stimulants such as dextroamphetamine (Dexedrine) and methylphenidate (Ritalin) have chemical structures that are similar to key brain neurotransmitters called monoamines, which include norepinephrine and dopamine. Stimulants increase the levels of these chemicals in the brain and body. This, in turn, increases blood pressure and heart rate, constricts blood vessels, increases blood glucose, and opens up the pathways of the respiratory system. In addition, the increase in dopamine is associated with a sense of euphoria that can accompany the use of these drugs.

Research indicates that people with ADHD do not become addicted to stimulant medications, such as Ritalin, when taken in the form prescribed and at treatment dosages.5 However, when misused, stimulants can be addictive.

The consequences of stimulant abuse can be extremely dangerous. Taking high doses of a stimulant can result in an irregular heartbeat, dangerously high body temperatures, and/or the potential for cardiovascular failure or lethal seizures. Taking high doses of some stimulants repeatedly over a short period of time can lead to hostility or feelings of paranoia in some individuals.

Stimulants should not be mixed with antidepressants or over-the-counter cold medicines containing decongestants. Anti-depressants may enhance the effects of a stimulant, and stimulants in combination with decongestants may cause blood pressure to become dangerously high or lead to irregular heart rhythms.

Treatment of addiction to prescription stimulants, such as methylphenidate and amphetamines, is based on behavioral therapies proven effective for treating cocaine or methamphetamine addiction. At this time, there are no proven medications for the treatment of stimulant addiction. Antidepressants, however, may be used to manage the symptoms of depression that can accompany early abstinence from stimulants. Depending on the patient's situation, the first step in treating prescription stimulant addiction may be to slowly decrease the drug's dose and attempting to treat withdrawal symptoms. This process of detoxification could then be followed with one of many behavioral therapies. Contingency management, for example, uses a system that enables patients to earn vouchers for drug-free urine tests; the vouchers can be exchanged for items that promote healthy living. Cognitive-behavioral therapies are proving beneficial, and recovery support groups may also be effective in conjunction with a behavioral therapy.

Reference - National Institute on Drug Abuse, *Research Report Series: Prescription Drugs/Abuse and Addiction,* April 2001.

1 These data are from the 1999 National Household Survey on Drug Abuse (NHSDA), funded by the Substance Abuse and Mental Health Services Administration (SAMHSA). NHSDA is an annual survey on the nationwide prevalence and incidence of illicit drug, alcohol, and tobacco use among Americans age 12 and older. The 1999 NHSDA also provides estimates of State and Washington, D.C. data. For detailed information from of the latest survey, visit www.samhsa.gov or order a copy from 1-800-729-6686.

2 The Monitoring the Future (MTF) survey is conducted by the University of Michigan's Institute for Social Research and is funded by National Institute on Drug Abuse, National Institutes of Health. The survey has tracked 12th graders' illicit drug use and related attitudes since 1975; in 1991, 8th and 10th graders were added to the study. For the 2000 study, 45,173 students were surveyed from a representative sample of 435 public and private schools nationwide. The student response rate was 86 percent. For the latest survey results, please visit the NIDA website at www.drugabuse.gov.

3 L. Simoni-Wastila, The Use of Abusable Prescription Drugs: The Role of Gender, Journal of Women's Health and Gender-based Medicine 9(3):289-297, 2000.

4 The latest findings on drug abuse related hospital visits (emergency room data) and deaths (medical examiner data) are from the 1999 Drug Abuse Warning Network (DAWN), produced by the Substance Abuse and Mental Health Services Administration (SAMHSA). For detailed information from of the latest survey, visit www.samhsa.gov or order a copy from 1-800-729-6686.

5 Nora Volkow, et al., Dopamine Transporter Occupancies in the Human Brain Induced by Therapeutic Doses of Oral Methylphenidate, *Am J Psychiatry* 155:1325-1331, October 1998.