

Message from the Parish Nurses

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THE SCIENCE OF ADDICTION (PART 2)

Use and misuse of alcohol, nicotine, illicit drugs, and misuse of prescription drugs cost Americans more than \$700 billion a year in increased health cost, crime, and lost productivity. Every year, illicit and prescription drugs and alcohol contribute to the death of more than 90,000 Americans, while tobacco is linked to an estimated 480,000 deaths a year. In the August Parish Health Newsletter, you learned what drug addiction is, what biological and environment factors increase the risk of addiction, and some ways to prevent drug misuse and addiction. In this issue you will learn how drugs affect the brain, your health, and treatments being used for drug addiction.

INTRODUCING THE HUMAN BRAIN

The human brain is the most complex organ in the body. This three-pound mass of gray and white matter sits at the center of all human activity – you need it to drive a car, to enjoy a meal, to breathe, and to enjoy everyday activities. The brain regulates your body's basic function, enables you to interpret and respond to everything you experience, and shapes your behavior. In short, your brain is you – everything you think and feel, and who you are.

HOW DOES THE BRAIN WORK?

The brain is a complex communications network of billions of neurons, neurotransmitters, and receptors. Networks of neurons pass messages back and forth thousands of times a minute within the brain, spinal column, and nerves. These nerve networks control everything we feel, think, and do. The networks are made up of:

- **Neurons:** These are nerve cells that work nonstop to send messages.
- **Neurotransmitters:** This is the brain's chemical messenger that helps the messages travel from one neuron to another.
- **Receptors:** This is the brain's chemical receiver. A neurotransmitter and its receptor operate like a key and lock, a specific mechanism makes sure that each receptor will forward the right message only after interacting with the right kind of neurotransmitter.
- **Transporters:** This is the brain's chemical recyclers. Once neurotransmitters do their job, they are pulled back into their original neuron by transporters.

HOW DO DRUGS WORK IN THE BRAIN?

When someone puts these chemicals into their body, either by smoking, injecting, inhaling, or eating them, they tap into the brain's communication system and interfere with the way neurons send, receive, and process signals via neurotransmitters. Some drugs, such as marijuana and heroin, can activate neurons because their chemical structure mimics that of a natural neurotransmitter in the body. This allows the drug to attach onto and activate the neurons. Although these drugs mimic the brain's own chemicals, they don't activate neurons in the same way as a natural neurotransmitter, and they lead to abnormal messages being sent through the network.

Drugs, such as amphetamine or cocaine, can cause the neurons to release abnormally large amounts of neurotransmitters or prevent the normal recycling of these brain chemicals by interfering with transporters. This too amplifies or disrupts the normal communication between neurons. Other drugs like opioids also affect other parts of the brain, such as the brain stem, which controls basic functions critical for life, such as heart rate, breathing, and sleeping explaining why overdoses can cause depressed breathing and death.

WHY ARE DRUGS MORE ADDICTIVE THAN NATURAL REWARDS?

Just as we turn down the volume on a radio that is too loud, the brain of someone who misuses drugs adjusts by producing fewer neurotransmitters in the reward circuit, or by reducing the number of receptors that can receive signals. As a result, the person's ability to experience pleasure from naturally rewarding (i.e., reinforcing) activities is also reduced.

This is why a person who misuses drugs eventually feel flat, without motivation, lifeless, and/or depressed, and is unable to enjoy things that were previously pleasurable. Now the person needs to keep taking drugs to experience even a normal level of reward – which only makes the problem worse, like a vicious cycle. Also, the person will often need to take larger amounts of drugs to produce the familiar high and effect known as tolerance.

By Barbara Mueller, RN, Faith Community Nurse

Source: National Institute on Drug Abuse; National Institute of Health; U.S. Dept. of Health and Human Services

Visit: www.StAgnesShepherdstown.org to read the continuation of “**The Science of Addiction (Part 2)**”.

Click on: Parish Health Newsletter

ADDICTION AND HEALTH

WHAT ARE THE OTHER HEALTH CONSEQUENCES OF DRUG ADDICTION?

People with addiction often have one or more associated health issues, which could include lung or heart disease, stroke, cancer, or mental health conditions. Imaging scans, chest X-rays, and blood tests can show the damaging effects of long-term drug use throughout the body. For example:

- **Tobacco smoke** can cause many cancers.
- **Methamphetamine** can cause severe dental problems, known as “meth mouth.”
- **Opioids** can lead to overdose and death.
- **Inhalants** may damage or destroy nerve cells, either in the brain or the peripheral nervous system (the nervous system outside the brain and spinal cord).

HOW CAN ADDICTION HARM OTHER PEOPLE?

Beyond the harmful consequences for the person with addiction, drug use can cause serious health problems for others. Some of the more severe consequences of addiction are:

- **Negative effects of drug use while pregnant or breastfeeding.** A mother’s substance or medication use during pregnancy can cause her baby to go into withdrawal after it’s born. Symptoms may include tremors, problems with sleeping and feeding, and even seizures. Some drug exposed children will have developmental problems with behavior, attention, and thinking. In addition, some substances can make their way into a mother’s breast milk.
- **Negative effects of secondhand smoke.** Secondhand tobacco smoke exposes bystanders to at least 250 chemicals that are known to be harmful, particularly to children. Involuntary exposure to secondhand smoke increases the risks of heart disease and lung cancer in people who have never smoked.
- **Increased spread of infectious disease.** Injection of drugs accounts for 1 in 10 of cases of human immunodeficiency virus (HIV), is also the major factor in the spread of hepatitis C (a serious liver disease), and can be the cause of endocarditis (infection of heart and its valves) and cellulitis (a skin infection). Drugs that are misused can cause intoxication, which hinders judgement and increases the chance of risky sexual behaviors.
- **Increased risk of motor vehicle accidents.** Use of illicit drugs or misuse of prescription drugs can make driving a car unsafe - just like driving after drinking

alcohol. Drugged driving puts the driver, passengers, and others who share the road at risk.

TREATMENT AND RECOVERY

CAN ADDICTION BE TREATED SUCCESSFULLY?

Yes, addiction is a treatable disorder. Research on the science of addiction and the treatment of substance use disorders has led to the development of research-based methods that help people to stop using drugs and resume productive lives, also known as being in recovery.

CAN ADDICTION BE CURED?

Like other chronic diseases such as heart disease or asthma, treatment for drug addiction usually isn’t a cure. But addiction can be managed successfully. Treatment enables people to counteract addiction’s disruptive effects on their brain and behavior and regain control of their lives.

DOES RELAPSE TO DRUG USE MEAN TREATMENT HAS FAILED?

No. The chronic nature of addiction means that for some people relapse, or a return to drug use after an attempt to stop, can be a part of the process. When a person recovering from an addiction relapses, it indicates that the person needs to speak with their doctor to resume treatment, modify it, or try another treatment.

WHAT ARE THE PRINCIPLES OF EFFECTIVE TREATMENT?

Research shows that treating addictions to opioids (prescription pain relievers or drugs like heroin or fentanyl), medication should be first line of treatment, usually combined with some form of behavioral therapy or counseling. Medications are also available to help treat addiction to alcohol and nicotine.

Additionally, medications are used to help people detoxify from drugs, Detoxification alone without subsequent treatment generally leads to resumption of drug use.

For people with addictions to drugs like stimulants or cannabis, no medications are currently available to assist in treatment, so treatment consists of behavioral therapies. Treatment should be tailored to address each patient’s drug patterns and drug-related medical, mental, and social problems.

By Barbara Mueller, RN, Faith Community Nurse

Source: National Institute of Drug Abuse; National Institutes of Health; U.S. Dept. of Health and Human Services

More information can be found on treatment and recovery at: <http://www.drugabuse.gov/publications/drug-brain-behavior-science-addiction/drug-abuse-addiction>