Rise Life Management Services

What is Cocaine?

Cocaine ($C_{17}H_{21}NO_4$) is a powerfully addictive, psychoactive, stimulant drug. On the street it is usually sold as a fine, white powder. The powdered, hydrochloride salt form of cocaine can be snorted or dissolved in water and injected. Freebase, or crack is cocaine hydrochloride that is processed with ammonia or sodium bicarbonate (baking soda solution) and heated to remove the hydrochloride salt. This ‘freebase’ form of cocaine is not water-soluble; it comes in a rock crystal that can be heated and its vapors smoked. Crack may be processed with a high percentage of impurities. The term "crack" refers to the crackling sound heard when it is heated prior to smoking. Cocaine use in Jamaica and generally around the world is illegal when used as recreational drug.

Cocaine originates from coca leaves, and has been used for centuries in a variety of cultural applications. Pure cocaine is extracted from the *Erythroxylon* coca bush, found primarily in the South American countries of Peru, Bolivia, and Columbia. Coca-leaf infusions or teas have been used to combat altitude sickness and boost energy in many native tribes of South America.[1]

Methods of Cocaine Abuse

Cocaine is most commonly abused by snorting, smoking or injecting the drug. It can also be rubbed onto mucous membranes.

Cocaine hydrochloride (HCL) is water soluble due to the HCL salt and can be injected; it is also snorted in powder form. Cocaine hydrochloride, when purchased on the street, is usually ‘cut’ with adulterants such as baking soda, talcum powder, lactose sugar, or other local anesthetics such as lidocaine or benzocaine. This increases the weight of the cocaine and allows the seller to make more profit on the street. Other more dangerous adulterants, such as methamphentamine, may also be used to cut cocaine.

When cocaine is snorted, the drug is usually laid out on a mirror, plate or other flat surface, separated into ‘lines’ and snorted nasally through a

straw, rolled-up dollar bill or other inhaling device. The cocaine is absorbed into the bloodstream through the nasal tissues. The effect, or ‘high’ with snorting may last 15 to 30 minutes, but does not occur as quickly as smoking or injecting it. Alternatively, smoking crack or injecting cocaine may have a rapid and more intense effect, but the ‘high’ only lasts 5 to 10 minutes. Cocaine is often repeatedly used in short periods of time to sustain the high, an action called ‘binging’.

Effects of Cocaine Use

Cocaine’s effect is described as euphoric with increased energy, reduced fatigue, and heightened mental altertness. Users may be talkative, extraverted, and have a loss of appetite or need for sleep. Cocaine’s psychoactive, pleasurable effects are short-lived without continued administration.[1]

Cocaine’s effect occurs in the midbrain region called the ventral tegmental area (VTA). Neuronal fibers from the VTA connect to the nucleus accumbens, an area of the brain responsible for rewards. Animals studies show that levels of a brain chemical (neurotransmitter) known as dopamine are increased in this area during rewards. Normally, dopamine is released and recycled in response to these rewards. The use of cocaine can interfere with this process, allowing dopamine to accumulate and send an amplified ‘reward’ signal to the brain, resulting in the euphoria described by users.[1]

Some users of cocaine report feelings of restlessness, irritability, and anxiety. A tolerance to the high may develop - many addicts report that they seek but fail to achieve as much pleasure as they did from their first exposure. Some users will increase their doses to intensify and prolong the euphoric effects. While tolerance to the high can occur, users can also become more sensitive to cocaine's anesthetic and convulsant effects without increasing the dose taken. This increased sensitivity may explain some deaths occurring after apparently low doses of cocaine.

Use of cocaine in a binge, during which the drug is taken repeatedly and at increasingly high doses, may lead to a state of increasing irritability, restlessness, and paranoia. This can result in a period of paranoid

psychosis, in which the user loses touch with reality and experiences auditory hallucinations.

Metabolism of Cocaine

Cocaine is metabolized primarily in the liver, with less than one percent of the parent drug being excreted in the urine. The primary metabolite is benzoylecgonine and is detectable in the urine for up to eight days after cocaine consumption.

Health Hazards Due to Cocaine Use

The immediate physical effects of cocaine use include constricted blood vessels, dilated pupils, and increased temperature, heart rate, and blood pressure. Health complications associated with cocaine use include disturbances in heart rhythm and heart attacks, chest pain and respiratory failure, strokes, seizures and headaches, and gastrointestinal complications such as abdominal pain and nausea.

The various means of using cocaine can produce different adverse reactions. Snorting cocaine can lead to loss of the sense of smell, nosebleeds, problems with swallowing, hoarseness, and a chronically runny nose. Ingesting cocaine can cause severe bowel gangrene due to reduced blood flow. People who inject cocaine can experience severe allergic reactions and, as with all injecting drug users, are at increased risk for contracting HIV, viral hepatitis and other blood-borne diseases.

Cocaine abuse can lead to acute cardiovascular or cerebrovascular emergencies, such as a heart attack or stroke, which may result in sudden death. Cocaine-related deaths are often a result of cardiac arrest or seizure followed by respiratory arrest.

A particularly concerning, yet often unknown interaction between alcohol and cocaine has been reported. The National Institute on Drug Abuse (NIDA) has found that the human liver combines cocaine and alcohol and manufactures a third substance, cocaethylene, that intensifies cocaine's euphoric effects but may increase the risk of sudden death. According to the NIDA, this drug-drug interaction, between cocaine and alcohol, is the most common two-drug combination that results in drug-

related deaths. Cocaine is a strongly addictive drug. Long-term effects of cocaine use can lead to tolerance, meaning high doses and/or more frequent use is needed to attain the same level of pleasure during the initial period of use. Because cocaine has a tendency to decrease appetite, many chronic users can become malnourished. If cocaine is used in a binge fashion, with frequent, repeated use over a short period of time, panic and paranoia may set in, with psychosis and auditory hallucinations possible.

Cocaine Use in Pregnancy

The full extent of cocaine effects on the unborn or newborn child are not fully known. Studies have shown that infants born to women who use cocaine during pregnancy may be delivered prematurely, have low birth rates, and may be shorter in length. Women who abuse cocaine may have other addictive habits, such as nicotine and alcohol use. The amount of prenatal care, exposure to sexually transmitted diseases, and socioeconomic factors may also affect infant outcomes. Research is finding that exposure to cocaine in utero may also lead to deficits in cognitive abilities, information processing, and ability to complete tasks in childhood.

Treatment Options for Cocaine Abusers and Addiction

The extensive abuse of cocaine has lead to efforts to develop treatment programs for this type of drug abuse. The majority of abusers seeking treatment programs are smoke crack, and are likely to be polydrug abusers. Strategies are needed to address the neurobiologial, social and medical aspects of cocaine addiction. Behavioral and pharmacologic strategies are required.

As of December 2011, there were no FDA-approved medications to treat cocaine addiction. One of the National Institute on Drug Abuse's top research priorities is to find a medication to block or greatly reduce the effects of cocaine, to be used as one part of a comprehensive treatment program. The National Institute on Drug Abuse funded researchers are also looking at medications that help alleviate the severe craving that

people in treatment for cocaine addiction often experience. Several medications are currently being investigated for their safety and efficacy in treating cocaine addiction. Vigabatrin, modafinil, tiagabine, disulfiram and topiramate show promise in controlled clinical trials. Additionally, in 2011, treatments that target dopamine D3 receptors were being researched for safety in humans.

In addition to treatment medications, behavioral interventions - particularly cognitive behavioral therapy - can be effective in decreasing drug use by patients in treatment for cocaine abuse. Providing the optimal combination of treatment and services for each individual is critical to successful outcomes.

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