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## A REVIEW ON DRUG ADDICTION AND HABITUATION AND TREATMENT FOR DRUG ADDICTON

Shirish S. Patil\* and Sourabh S. Malabade

Shri Appasaheb Birnale College of Pharmacy, Sangli - 416416, Maharashtra, India.

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### Correspondence to Author:

**Shirish S. Patil**

Shri Appasaheb Birnale College of Pharmacy, Sangli - 416416, Maharashtra, India.

**E-mail:** Patilshirish23@gmail.com

**ABSTRACT:** Drug addiction has become a worldwide problem and the leading cause of death. In recent years, India is seeing a rising trend in drug addiction. The most common drug use in India is alcohol, followed by cannabis and opiates. Drug use, whether licit or illicit, causes serious health problems in individuals. The national survey on drug use in India indicated that the prevalence of drug abuse among males in the general population is significant. Economic burdens disturbed family environments, violence, and psychological problems are other consequences of drug abuse in the family. Adolescent drug abuse is another major area of concern because more than half of the person's with substance use disorder are introduced to drugs before the age of 15-year Drug treatment is intended to help addicted individuals stop compulsive drug seeking and use. Treatment can occur in a variety of settings, take many different forms, and last for different lengths of time. Because drug addiction is typically a chronic disorder characterized by occasional relapses, short-term, one-time treatment is usually not sufficient. For many, treatment is a long-term process that involves multiple interventions and regular monitoring. The current paper highlights the causes of drug abuse and describes the treatment and prevention of drug abuse and addiction to properly manage the problem.

### INTRODUCTION:

**Drug and Drug Use**<sup>1</sup>: A drug is a substance that can be taken into the human body and, once taken, alters some processes within the body. Drugs can be used to diagnose, prevent or treat a disease. Some drugs are used to kill bacteria and help the body recover from infections. Some drugs assist in terminating headaches. Some drugs cross the blood-brain barrier and affect neurotransmitter function.

**Overdoses:** Overdosing refers to taking enough of a drug such that functioning is grossly impaired, and even survival may be jeopardized. Regarding drug use action, some doses produce the intended effect for a percentage of drug users (i.e., effective dose) and a dose that will kill the drug user (i.e., lethal dose). Different means of administration, time for distribution, time for action, time for elimination, and context factors may affect the effective-to-lethal dose relation.

Overdosing often refers to reaching a near-fatal dose but not always; it may also mean loss of function such that special care is needed. Drug addiction, as described by WHO (1950) is "a stage of periodic and chronic intoxication detrimental to the individual and society, produced by the

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repeated consumption of a drug (natural or synthetic)."

### Its Characteristics Include:

1. An overwhelming desire, a need (compulsion) to continue taking drugs and to obtain it by any means;
2. A tendency to increase the dose;
3. A psychic (psychological), sometimes physical, dependence on the effects of the drugs.

Drug dependence is the process of chemicals that affect the central nervous system in a way

### Terminologies in Drug Abuse<sup>1,2</sup>:

TABLE 1: TERMINOLOGIES IN DRUG ABUSE

Term	General description	Example
Drug	A substance that can be taken into the body that alters one or more processes within the body	Alcohol, nicotine, cocaine, marijuana, etc
Street drug	Any drug that is misused; that is, any drug that may have dangerous consequences and is considered improper to use either intrinsically or within the social circumstances in which it is used	Alcohol (in underage drinking), heroin, methamphetamine, crack, cocaine, marijuana
Hard drug	A drug that is generally considered to be more dangerous, with a higher risk of dependence than soft drugs	Heroin, methamphetamine, crack/cocaine
Soft drug	A drug whose use supposedly does not result in as severe a degree of dependence as a hard drug and is often considered relatively less dangerous by society, although the negative consequences may be just as or more severe (e.g., lung cancer from tobacco use)	Marijuana, alcohol, nicotine
Illicit drug	An illegal drug; that is, the drug is not a legally prescribed drug/pharmaceutical	Marijuana, cocaine, heroin, LSD
Designer drug	A synthetic drug very similar in chemical makeup to an existing drug and thus exerting similar pharmacological effects as the existing drug	Ecstasy
Club drug	A drug whose use primarily occurs in clubs, bars, and trance parties, such as raves, and usually by adolescents or young adults	Ecstasy, Rohypnol ("roofies"), GHB, ketamine ("special K"), LSD

### Biology of Drug-Addiction<sup>5</sup>:

**Neurobiology of Reward:** Organisms possess adaptive, evolutionarily determined systems that mediate the acquisition of pleasurable rewarding behavior needed for survival, i.e., sex, food, and social affiliation, and avoidance of aversive events. Three brain areas mediate such adaptive behaviour: the nucleus accumbens, which mediates reward-related activities (positive valence); the amygdala, involved in fear-motivated behaviour (negative valence) and the prefrontal cortex, involved in decision-making and prediction of rewarding behaviour by determining salience attribution of environmental stimuli and directing the intensity of the behavioural response. Balanced functioning of motivational and affective states combined with external stimuli that predict reward determine the

overall output of a given behavioural response in acquiring natural reward.

experienced as pleasurable but hazardous to health if taken in immoderate amounts. More importantly, from the clinical point of view, their intoxicating effects may acquire a compulsive allure that it is so powerful as to defy rational control. Drug dependence is a psychological and physiological phenomenon where it becomes extremely difficult or impossible for the drug user to stop the habit. Psychological dependence occurs when a drug is so central to the person's thoughts, emotions, and activities that it is extremely difficult to stop or even think about it. An intense craving marks it for the drug and its effects.

overall output of a given behavioural response in acquiring natural reward.

**What Happens to the Brain when Drugs are taken:** Drugs tap into the brain's communication system and disrupt the normal functioning of the brain cells sending, receiving, and processing information. There are two ways a drug can disrupt normal cell functioning:

1. By imitating the brain neurotransmitters
2. By over-stimulating the "reward circuit" of the brain.

Some drugs, such as marijuana and heroin, have structural similarities to some neurotransmitters naturally produced by the brain and fool the brain

receptors and activate the nerve cells to send abnormal messages. Some drugs, such as cocaine and methamphetamines, stimulate the nerve cells to release abnormally large amounts of natural neurotransmitters or prevent the normal recycling of these brain chemicals. It produces greatly amplified messages and disrupts normal communication patterns. Almost all addictive drugs target the brain's reward system by flooding the circuit with dopamine. These drugs activate the mesolimbic dopamine system, reinforcing pharmacological and natural rewards. The mesolimbic system consists of dopaminergic neurons in the ventral tegmental area (VTA) and their axonal projections to terminal fields in the nucleus accumbens (NA) and the prefrontal cortex (PFC). Addictive drugs act on this system to increase synaptic levels of dopamine (DA). These drugs have specific receptors in the brain, and an increase in dopamine levels in the mesolimbic system produces their final effect.

### Causes of Drug Addiction <sup>3</sup>:

- A. Environmental Causes
- B. Genetic causes
- C. Development causes
- D. Traumatic causes
- E. Mental Health Causes

**(A) Environmental Causes:** A person's environment plays a large role in the development of drug addiction. Some people turn to drug use to cope with problems in their real lives. Being around drugs and being exposed to addicts can also lead to drug addiction. If a family member or close friend uses or is addicted to drugs, it seems more acceptable for other members to engage in similar behavior. It becomes a tolerated activity.

**(B) Genetic Causes:** Not everyone who tries a drug will become addicted. Researchers have determined that some people have a genetic predisposition to becoming addicted to drugs. For example, the dopamine D2 receptor A1 gene is more common in alcoholics and cocaine abusers than in the general public. Researchers believe this gene is linked to compulsive or feeling-seeking behavior. However, some people in the general public have this gene without developing an addiction; addiction likely involves more than just

a gene and requires other factors to play a role. Researchers have also found other genes associated with an increased or decreased susceptibility to drug (or alcohol) addiction. CYP2A6 is more common in non-smokers and causes nausea and dizziness after smoking; people who have two copies of the ALDH\*2 gene variation are less likely to become alcoholics.

**(C) Developmental Causes:** Events during development can increase one's risk of becoming addicted. Confused parental environments, childhood experiences, and early drug use can all have an influence. Adolescents are in a very vulnerable position because of their development or lack of it. The earlier drug use begins, the more likely it is to progress to abuse. Drug use changes the way the brain functions and makes it more likely that a person will become addicted; drug use makes it difficult to make clear decisions, control your behavior, and feel OK without the drug. Adolescents also lack the appropriate decision-making skills and are more prone to risk-taking behavior like drug use.

**(D) Traumatic Causes:** Drug use and abuse may also result from traumatic experiences. Sexual assault, a history of abuse, natural disasters, or post-traumatic stress disorder can all trigger drug or alcohol addiction.

**(E) Mental Health Causes:** Drug addiction can also be caused by using drugs to mask other mental problems. For example, depressed people frequently use drugs to escape their sad feelings. Schizophrenics find that some street drugs can control their hallucinations. In some cases, the drug use itself may lead to mental problems.

### Drugs of Abuse <sup>3,4</sup>:

**Alcohol:** People drink to socialize, celebrate, and relax. Alcohol often has a strong effect on people; throughout history, people have struggled to understand and manage alcohol's power. Why does alcohol cause people to act and feel differently? How much is too much? Why do some people become addicted while others do not? The National Institute on Alcohol Abuse and Alcoholism is researching the answers to these and many other questions about alcohol. Here's what is known:

- Alcohol's effects vary from person to person, depending on a variety of factors, including:
- How much you drink
- How often you drink
- Your age
- Your health status
- Your family history
- While drinking alcohol is not necessarily a problem, drinking too much can cause a range of consequences, and increase your risk for various problems.

For more information on alcohol's effects on the body, please see the National Institute on Alcohol Abuse and Alcoholism's (NIAAA's) related web page describing alcohol's effects on the body. NIAAA also has some information about mixing alcohol with certain medicines.

**Ayahuasca:** A hallucinogenic tea made in the Amazon from a DMT-containing plant (*Psychotria viridis*) along with another vine (*Banisteriopsis caapi*) that contains an MAO inhibitor preventing the natural breakdown of DMT in the digestive system, thereby enhancing serotonergic activity. It was used historically in Amazonian religious and healing rituals.

**TABLE 2: DRUG OF ABUSE: AYAHUASCA**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Aya, Yagé, Hoasca	No commercial uses	Brewed as tea	Swallowed as tea	DMT is Schedule I, but plants containing it are not controlled
<b>Possible Health Effects</b>				
Short-term		Strong hallucinations including altered visual and auditory perceptions; increased heart rate and blood pressure; nausea; burning sensation in the stomach; tingling sensations and increased skin sensitivity.		
Long-term		Possible changes to the serotonergic and immune systems, although more research is needed.		
Other Health-related Issues In Combination with Alcohol		Unknown.		
Withdrawal Symptoms		Unknown.		
<b>Treatment Options</b>				
Medications		It is not known whether ayahuasca is addictive. There are no FDA-approved medications to treat addiction to ayahuasca or other hallucinogens.		
Behavioral Therapies		More research is needed to find out if ayahuasca is addictive and, if so, whether behavioral therapies are effective.		

**Central Nervous System Depressants:** them useful for treating anxiety and sleep Medications that slow brain activity, which makes problems.

**TABLE 3: DRUG OF ABUSE: CENTRAL NERVOUS SYSTEM DEPRESSANTS**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Barbs, Phennies, Red Birds, Reds, Tooies, Yellow Jackets, Yellows	Barbiturates: pentobarbital (Nembutal <sup>®</sup> )	Pill, capsule, liquid	Swallowed, injected	II, III, IV
Candy, Downers, Sleeping Pills, Tranks	Benzodiazepines: alprazolam (Xanax <sup>®</sup> ), chlorodiazepoxide (Librium <sup>®</sup> ), diazepam (Valium <sup>®</sup> ), lorazepam (Ativan <sup>®</sup> ), triazolam (Halcion <sup>®</sup> )	Pill, capsule, liquid	Swallowed, snorted	IV
Forget-me Pill, Mexican Valium, R2, Roche, Roofies, Roofinol, Rope, Rophies	Sleep Medications: eszopiclone (Lunesta <sup>®</sup> ), zaleplon (Sonata <sup>®</sup> ), zolpidem (Ambien <sup>®</sup> )	Pill, capsule, liquid	Swallowed, snorted	IV
<b>Possible Health Effects</b>				
Short-term	Drowsiness, slurred speech, poor concentration, confusion, dizziness, problems with movement and memory, lowered blood pressure, slowed breathing.			

Long-term Other Health-related Issues	Unknown. Sleep medications are sometimes used as date rape drugs. Risk of HIV, hepatitis, and other infectious diseases from shared needles.
In Combination with Alcohol Withdrawal Symptoms	Further slows the heart rate and breathing, which can lead to death. Must be discussed with a health care provider; barbiturate withdrawal can cause a serious abstinence syndrome that may even include seizures.
<b>Treatment Options</b>	
Medications	There are no FDA-approved medications to treat addiction to prescription sedatives; lowering the dose over time must be done with the help of a healthcare provider.
Behavioral Therapies	More research is needed to determine if behavioral therapies can be used to treat addiction to prescription sedatives.

**Cocaine:** A powerfully addictive stimulant drug made from the coca plant leaves native to South America.

**TABLE 4: DRUG OF ABUSE: COCAINE**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Blow, Bump, C, Candy, Charlie, Coke, Crack, Flake, Rock, Snow, Toot	Cocaine hydrochloride topical solution (anesthetic rarely used in medical procedures)	White powder, whitish rock crystal	Snorted, smoked, injected	II
<b>Possible Health Effects</b>				
Short-term	Narrowed blood vessels; enlarged pupils; increased body temperature, heart rate, and blood pressure; headache; abdominal pain and nausea; euphoria; increased energy, alertness; insomnia, restlessness; anxiety; erratic and violent behavior, panic attacks, paranoia, psychosis; heart rhythm problems, heart attack; stroke, seizure, coma.			
Long-term	Loss of sense of smell, nosebleeds, nasal damage and trouble swallowing from snorting; infection and death of bowel tissue from decreased blood flow; poor nutrition and weight loss; lung damage from the smoking.			
Other Health-related Issues	Pregnancy: premature delivery, low birth weight, deficits in self-regulation and attention in school-aged children prenatally exposed. Risk of HIV, hepatitis, and other infectious diseases from shared needles.			
In Combination with Alcohol Withdrawal Symptoms	Greater risk of cardiac toxicity than from either drug alone. Depression, tiredness, increased appetite, insomnia, vivid, unpleasant dreams, slowed thinking and movement, restlessness.			
<b>Treatment Options</b>				
Medications	There are no FDA-approved medications to treat cocaine addiction.			
Behavioral Therapies	Cognitive-behavioral therapy (CBT) Contingency management, or motivational incentives, including vouchers, The Matrix Model, Community-based recovery groups, such as 12-Step programs, Mobile medical application: reSET <sup>®</sup>			

**GHB:** A depressant approved for narcolepsy, a disorder that causes daytime "sleep attacks."

**TABLE 5: DRUG OF ABUSE: GHB**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
G, Georgia Home Boy, Goop, Grievous Bodily Harm, Liquid Ecstasy, Liquid X, Soap, Scoop	Gamma-hydroxybutyrate or sodium oxybate (Xyrem <sup>®</sup> )	Colorless liquid, white powder	Swallowed (often combined with alcohol or other beverages)	I
<b>Possible Health Effects</b>				
Short-term	Euphoria, drowsiness, nausea, vomiting, confusion, memory loss, unconsciousness, slowed heart rate and breathing, lower body temperature, seizures, coma, death.			
Long-term	Unknown.			
Other Health-related Issues	Sometimes used as a date rape drug.			
In Combination with Alcohol Withdrawal Symptoms	Nausea, problems with breathing, greatly increased depressant effects. Insomnia, anxiety, tremors, sweating, increased heart rate and blood pressure, psychotic thoughts.			
<b>Treatment Options</b>				
Medications	Benzodiazepines.			
Behavioral Therapies	More research is needed to find out if behavioral therapies can be used to treat GHB addiction.			

**Heroin:** An opioid drug made from morphine, a natural substance extracted from the seed pod of various opium poppy plants.

**TABLE 6: DRUG OF ABUSE: HEROIN**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Brown sugar, China White, Dope, H, Horse, Junk, Skag, Skunk, Smack, White Horse With OTC cold medicine and antihistamine: Cheese	No commercial uses	White or brownish powder, or black sticky substance known as "black tar heroin"	Injected, smoked, snorted	I
<b>Possible Health Effects</b>				
Short-term	Euphoria; dry mouth; itching; nausea; vomiting; analgesia; slowed breathing and heart rate.			
Long-term	Collapsed veins; abscesses (swollen tissue with pus); infection of the lining and valves in the heart; constipation and stomach cramps; liver or kidney disease; pneumonia.			
Other Health-related Issues	Pregnancy: miscarriage, low birth weight, neonatal abstinence syndrome. Risk of HIV, hepatitis, and other infectious diseases from shared needles.			
In Combination with Alcohol	Dangerous slowdown of heart rate and breathing, coma, death.			
Withdrawal Symptoms	Restlessness, muscle and bone pain, insomnia, diarrhea, vomiting, cold flashes with goose bumps ("cold turkey").			
<b>Treatment Options</b>				
Medications	Methadone, Buprenorphine, Naltrexone (short- and long-acting forms)			
Behavioral Therapies	Contingency management, or motivational incentives, 12-Step facilitation therapy, Mobile medical application: reSET-O™ used in conjunction with treatment that includes buprenorphine and contingency management			

**Inhalants:** Solvents, aerosols, and gases found in household products such as spray paints, markers, glues, and cleaning fluids; also nitrites (e.g., amyl nitrite), which are prescription medications for chest pain.

**TABLE 7: DRUG OF ABUSE: INHALANTS**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Poppers, snappers, whippets, laughing gas	Various	Paint thinners or removers, degreasers, dry-cleaning fluids, gasoline, lighter fluids, correction fluids, permanent markers, electronics cleaners and freeze sprays, glue, spray paint, hair or deodorant sprays, fabric protector sprays, aerosol computer cleaning products, vegetable oil sprays, butane lighters, propane tanks, whipped cream aerosol containers, refrigerant gases, ether, chloroform, halothane, nitrous oxide	Inhaled through the nose or mouth	Not scheduled
<b>Possible Health Effects</b>				
Short-term	Confusion; nausea; slurred speech; lack of coordination; euphoria; dizziness; drowsiness; disinhibition, lightheadedness, hallucinations/delusions; headaches; sudden sniffing death due to heart failure (from butane, propane, and other chemicals in aerosols); death from asphyxiation, suffocation, convulsions or seizures, coma, or choking. Nitrites: enlarged blood vessels, enhanced sexual pleasure, increased heart rate, brief sensation of heat and excitement, dizziness, headache.			
Long-term	Liver and kidney damage; bone marrow damage; limb spasms due to nerve damage; brain damage from lack of oxygen that can cause problems with thinking, movement, vision, and hearing. Nitrites: increased risk of pneumonia.			
Other Health-related Issues	Pregnancy: low birth weight, bone problems, delayed behavioral development due to brain problems, altered metabolism and body composition.			
In Combination with Alcohol	Unknown.			
Withdrawal Symptoms	Nausea, tremors, irritability, problems sleeping, and mood changes.			
<b>Treatment Options</b>				

Medications	There are no FDA-approved medications to treat inhalant addiction.
Behavioral Therapies	More research is needed to find out if behavioral therapies can be used to treat inhalant addiction.

**Ketamine:** A dissociative drug used as an anesthetic in veterinary practice. Dissociative drugs are hallucinogens that cause the user to feel detached from reality. For more information, see the Hallucinogens and Dissociative Drugs Research Report

**TABLE 8: DRUG OF ABUSE: KETAMINE**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Cat Valium, K, Special K, Vitamin K	Ketalar <sup>®</sup>	Liquid, white powder	Injected, snorted, smoked (powder added to tobacco or marijuana cigarettes), swallowed	III
<b>Possible Health Effects</b>				
Short-term	Problems with attention, learning, and memory; dreamlike states, hallucinations; sedation; confusion; loss of memory; raised blood pressure; unconsciousness; dangerously slowed breathing.			
Long-term	Ulcers and pain in the bladder; kidney problems; stomach pain; depression; poor memory.			
Other Health-related Issues	Sometimes used as a date rape drug. Risk of HIV, hepatitis, and other infectious diseases from shared needles.			
In Combination with Alcohol	Increased risk of adverse effects.			
Withdrawal Symptoms	Unknown.			
<b>Treatment Options</b>				
Medications	There are no FDA-approved medications to treat addiction to ketamine or other dissociative drugs.			
Behavioral Therapies	More research is needed to find out if behavioral therapies can be used to treat addiction to dissociative drugs.			

**LSD (Lysergic Acid):** A hallucinogen manufactured from lysergic acid found in ergot, a fungus that grows on rye and other grains. LSD is an abbreviation of the scientific name lysergic acid diethylamide.

**TABLE 9: DRUG OF ABUSE: LSD (LYSERGIC ACID)**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Acid, Blotter, Blue Heaven, Cubes, Microdot, Yellow Sunshine	No commercial uses	Tablet; capsule; clear liquid; small, decorated squares of absorbent paper that liquid has been added to	Swallowed, absorbed through mouth tissues (paper squares)	I
<b>Possible Health Effects</b>				
Short-term	Rapid emotional swings; distortion of a person's ability to recognize reality, think rationally, or communicate with others; raised blood pressure, heart rate, body temperature; dizziness; loss of appetite; tremors; enlarged pupils.			
Long-term	Frightening flashbacks (called Hallucinogen Persisting Perception Disorder [HPPD]); ongoing visual disturbances, disorganized thinking, paranoia, and mood swings.			
Other Health-related Issues	Unknown.			
In Combination with Alcohol	Unknown.			
Withdrawal Symptoms	Unknown.			
<b>Treatment Options</b>				
Medications	There are no FDA-approved medications to treat addiction to LSD or other hallucinogens.			
Behavioral Therapies	More research is needed to find out if behavioral therapies can be used to treat addiction to hallucinogens.			

**Marijuana (Cannabis):** Marijuana is made from the hemp plant, *Cannabis sativa*. The main psychoactive (mind-altering) chemical in marijuana is delta-9-tetrahydrocannabinol or THC.

**TABLE 10: DRUG OF ABUSE: MARIJUANA (CANNABIS)**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Blunt, Bud, Dope, Ganja, Grass, Green, Herb, Joint, Mary Jane, Pot, Reefer, Sinsemilla, Skunk, Smoke, Trees, Weed; Hashish: Boom, Gangster, Hash, Hemp	Various brand names in states where the sale of marijuana is legal	Greenish-gray mixture of dried, shredded leaves, stems, seeds, and/or flowers; resin (hashish) or sticky, black liquid (hash oil)	Smoked, eaten (mixed in food or brewed as tea)	I
<b>Possible Health Effects</b>				
Short-term	Enhanced sensory perception and euphoria followed by drowsiness/relaxation; slowed reaction time; problems with balance and coordination; increased heart rate and appetite; problems with learning and memory; anxiety.			
Long-term	Mental health problems, chronic cough, frequent respiratory infections.			
Other Health-related Issues	Youth: possible loss of IQ points when repeated use begins in adolescence.			
In Combination with Alcohol	Pregnancy: babies are born with problems with attention, memory, and problem-solving.			
Withdrawal Symptoms	Increased heart rate, blood pressure; further slowing mental processing and reaction time. Irritability, trouble sleeping, decreased appetite, anxiety.			
<b>Treatment Options</b>				
Medications	There are no FDA-approved medications to treat marijuana addiction.			
Behavioral Therapies	Cognitive-behavioral therapy (CBT), Contingency management, or motivational incentives, Motivational Enhancement Therapy (MET), Behavioral treatments geared to adolescents, Mobile medical application: reSET <sup>®</sup>			

**MDMA (Ecstasy/Molly):** A synthetic, psychoactive drug similar to the amphetamine and the hallucinogen mescaline. MDMA is an abbreviation of the scientific name 3, 4-methylenedioxy-metham-phetamine.

**TABLE 11: DRUG OF ABUSE: MDMA (ECSTASY/MOLLY)**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Adam, Clarity, Eve, Lover's Speed, Peace, Uppers	No commercial uses	Colorful tablets with imprinted logos, capsules, powder, liquid	Swallowed, snorted	I
<b>Possible Health Effects</b>				
Short-term	Lowered inhibition; enhanced sensory perception; increased heart rate and blood pressure; muscle tension; nausea; faintness; chills or sweating; sharp rise in body temperature leading to kidney failure or death.			
Long-term	Long-lasting confusion, depression, problems with attention, memory, and sleep; increased anxiety, impulsiveness; less interest in sex.			
Other Health-related Issues	Unknown.			
In Combination with Alcohol	MDMA decreases some of alcohol's effects. Alcohol can increase plasma concentrations of MDMA, which may increase the risk of neurotoxic effects.			
Withdrawal Symptoms	Fatigue, loss of appetite, depression, trouble concentrating.			
<b>Treatment Options</b>				
Medications	There is conflicting evidence about whether MDMA is addictive. There are no FDA-approved medications to treat MDMA addiction.			
Behavioral Therapies	More research is needed to find out if behavioral therapies can be used to treat MDMA addiction.			

**Methamphetamine:** An extremely addictive stimulant amphetamine drug.

**TABLE 11: DRUG OF ABUSE: METHAMPHETAMINE**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Crank, Chalk, Crystal, Fire, Glass, Go Fast, Ice, Meth, Speed	Desoxyn <sup>®</sup>	White powder or pill; crystal meth looks like pieces of glass or shiny blue-white "rocks" of different sizes	Swallowed, snorted, smoked, injected	II
<b>Possible Health Effects</b>				
Short-term	Increased wakefulness and physical activity; decreased appetite; increased breathing, heart rate, blood pressure, temperature; irregular heartbeat.			

Long-term	Anxiety, confusion, insomnia, mood problems, violent behavior, paranoia, hallucinations, delusions, weight loss, severe dental problems (“meth mouth”), intense itching leading to skin sores from scratching.
Other Health-related Issues	Pregnancy: premature delivery; separation of the placenta from the uterus; low birth weight; lethargy; heart and brain problems. Risk of HIV, hepatitis, and other infectious diseases from shared needles.
In Combination with Alcohol	Masks the depressant effect of alcohol, increasing risk of alcohol overdose; may increase blood pressure.
Withdrawal Symptoms	Depression, anxiety, tiredness.
<b>Treatment Options</b>	
Medications	There are no FDA-approved medications to treat methamphetamine addiction.
Behavioral Therapies	Cognitive-behavioral therapy (CBT), Contingency management, or motivational incentives, The Matrix Model, 12-Step facilitation therapy, Mobile medical application: reSET®

**Over-the-Counter Medicines:**

**Dextromethorphan (DXM):** Psychoactive when taken in higher-than-recommended amounts.

**TABLE 13: DRUG OF ABUSE: DEXTROMETHORPHAN (DXM)**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Robotripping, Robo, Triple C	Various (many brand names include “DM”)	Syrup, capsule	Swallowed	Not scheduled
<b>Possible Health Effects</b>				
Short-term	Cough relief; euphoria; slurred speech; increased heart rate and blood pressure; dizziness; nausea; vomiting.			
Long-term	Unknown.			
Other Health-related Issues	Breathing problems, seizures, and increased heart rate may occur from other ingredients in cough/cold medicines.			
In Combination with Alcohol	Unknown.			
Withdrawal Symptoms	Unknown.			
<b>Treatment Options</b>				
Medications	There are no FDA-approved medications to treat addiction to dextromethorphan.			
Behavioral Therapies	More research is needed to find out if behavioral therapies can be used to treat addiction to dextromethorphan.			

**Over the Counter Medicines:**

**Loperamide:** An anti-diarrheal that can cause euphoria when taken in higher-than-recommended doses.

**TABLE 14: DRUG OF ABUSE: LOPERAMIDE**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
None	Immodium	Tablet, capsule, or liquid	Swallowed	Not scheduled
<b>Possible Health Effects</b>				
Short-term	Controls diarrhea symptoms. In high doses, can produce euphoria. May lessen cravings and withdrawal symptoms of other drugs.			
Long-term	Unknown.			
Other Health-related Issues	Fainting, stomach pain, constipation, loss of consciousness, cardiovascular toxicity, pupil dilation, and kidney failure from urinary retention.			
In Combination with Alcohol	Unknown.			
Withdrawal Symptoms	Severe anxiety, vomiting, and diarrhea.			
<b>Treatment Options</b>				
Medications	There are no FDA-approved medications to treat loperamide addiction.			
Behavioral Therapies	The same behavioral therapies that have helped treat addiction to heroin may be used to treat addiction to loperamide. Contingency management or motivational incentives			

**PCP (Phencyclidine):** A dissociative drug developed as an intravenous anesthetic that has been discontinued due to serious adverse effects.

Dissociative drugs are hallucinogens that cause the user to feel detached from reality. PCP is an abbreviation of the scientific name phencyclidine.

**TABLE 15: DRUG OF ABUSE: PCP (PHENYLCYCLIDINE)**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Angel Dust, Boat, Hog, Love Boat, Peace Pill	No commercial uses	White or colored powder, tablet, or capsule; clear liquid	Injected, snorted, swallowed, smoked (powder added to mint, parsley, oregano, or marijuana)	I, II
<b>Possible Health Effects</b>				
Short-term	Delusions, hallucinations, paranoia, problems thinking, a sense of distance from one's environment, anxiety. Low doses: slight increase in breathing rate; increased blood pressure and heart rate; shallow breathing; face redness and sweating; numbness of the hands or feet; problems with movement. High doses: nausea; vomiting; flicking up and down of the eyes; drooling; loss of balance; dizziness; violence; seizures, coma, and death.			
Long-term	Memory loss, problems with speech and thinking, loss of appetite, anxiety.			
Other Health-related Issues	PCP has been linked to self-injury. Risk of HIV, hepatitis, and other infectious diseases from shared needles.			
In Combination with Alcohol	Unknown.			
Withdrawal Symptoms	Headaches, increased appetite, sleepiness, depression.			
<b>Treatment Options</b>				
Medications	There are no FDA-approved medications to treat addiction to PCP or other dissociative drugs.			
Behavioral Therapies	More research is needed to find out if behavioral therapies can be used to treat addiction to dissociative drugs.			

**Prescription Opioids:** Pain relievers with an origin similar to that of heroin. Opioids can cause euphoria and are often used nonmedically, leading to overdose deaths.

**TABLE 16: DRUG OF ABUSE: PCP (PHENYLCYCLIDINE)**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Captain Cody, Cody, Lean, Schoolboy, Sizzurp, Purple Drank with <i>gluteth-imide</i> : Doors & Fours, Loads, Pancakes and Syrup Apache, China Girl, China White, Dance Fever, Friend, Goodfella, Jackpot, Murder 8, Tango and Cash, TNT	Codeine (various brand names)	Tablet, capsule, liquid	Injected, swallowed (often mixed with soda and flavorings)	II, III, V
Vike, Watson-387	Fentanyl (Actiq <sup>®</sup> , Duragesic <sup>®</sup> , Sublimaze <sup>®</sup> )	Lozenge, sublingual tablet, film, buccal tablet	Injected, smoked, snorted	II
D, Dillies, Footballs, Juice, Smack	Hydrocodone or dihydrocodeinone (Vicodin <sup>®</sup> , Norco <sup>®</sup> , Zohydro <sup>®</sup> , and others)	Capsule, liquid, tablet	Swallowed, snorted, injected	II
Demmies, Pain Killer	Hydromorphone (Dilaudid <sup>®</sup> )	Liquid, suppository	Injected, rectal	II
Amidone, Fizzies	Meperidine (Demerol <sup>®</sup> )	Tablet, liquid	Swallowed, snorted, injected	II
With MDMA: Chocolate Chip Cookies	Methadone (Dolophine <sup>®</sup> , Methadose <sup>®</sup> )	Tablet, dispersible tablet, liquid	Swallowed, injected	II
M, Miss Emma, Monkey, White Stuff	Morphine (Duramorph <sup>®</sup> , MS Contin <sup>®</sup> )	Tablet, liquid, capsule, suppository	Injected, swallowed, smoked	II, III
O.C., Oxycet, Oxycotton, Oxy, Hillbilly Heroin, Percs	Oxycodone (OxyContin <sup>®</sup> , Percodan <sup>®</sup> , Percocet <sup>®</sup> , and others)	Capsule, liquid, tablet	Swallowed, snorted, injected	II
Biscuits, Blue Heaven, Blues, Mrs. O, O Bomb, Octagons, Stop Signs	Oxymorphone (Opana <sup>®</sup> )	Tablet	Swallowed, snorted, injected	II
<b>Possible Health Effects</b>				
Short-term	Pain relief, drowsiness, nausea, constipation, euphoria, slowed breathing, death.			
Long-term	Increased risk of overdose or addiction if misused.			
Other Health-related Issues	Pregnancy: Miscarriage, low birth weight, neonatal abstinence syndrome.			

	Older adults: higher risk of accidental misuse because many older adults have multiple prescriptions, increasing the risk of drug-drug interactions and breakdown of drugs slows with age; also, many older adults are treated with prescription medications for pain.
In Combination with Alcohol Withdrawal Symptoms	Risk of HIV, hepatitis, and other infectious diseases from shared needles. Dangerous slowing of heart rate and breathing leading to coma or death. Restlessness, muscle and bone pain, insomnia, diarrhea, vomiting, cold flashes with goose bumps ("cold turkey"), leg movements.
<b>Treatment Options</b>	
Medications Behavioral Therapies	Methadone, Buprenorphine, Naltrexone (short- and long-acting) The same behavioral therapies that have helped treat addiction to heroin are used to treat prescription opioid addiction.

**Prescription Stimulants:** Medications that increase alertness, attention, energy, blood pressure, heart rate, and breathing rate.

**TABLE 17: DRUG OF ABUSE: PRESCRIPTION STIMULANTS**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Bennies, Black Beauties, Crosses, Hearts, LA Turnaround, Speed, Truck Drivers, Uppers	Amphetamine (Adderall®)	Tablet, capsule	Swallowed, snorted, smoked, injected	II
JIF, MPH, R-ball, Skippy, The Smart Drug, Vitamin R	Methylphenidate (Concerta®, Ritalin®)	Liquid, tablet, chewable tablet, capsule	Swallowed, snorted, smoked, injected, chewed	II
<b>Possible Health Effects</b>				
Short-term	Increased alertness, attention, energy; increased blood pressure and heart rate; narrowed blood vessels; increased blood sugar; opened-up breathing passages. High doses: dangerously high body temperature and irregular heartbeat; heart disease; seizures.			
Long-term Other Health-related Issues In Combination with Alcohol	Heart problems, psychosis, anger, paranoia. Risk of HIV, hepatitis, and other infectious diseases from shared needles. Masks the depressant action of alcohol, increasing risk of alcohol overdose; may increase blood pressure.			
Withdrawal Symptoms	Depression, tiredness, sleep problems.			
<b>Treatment Options</b>				
Medications Behavioral Therapies	There are no FDA-approved medications to treat stimulant addiction. Behavioral therapies that have helped treat addiction to cocaine or methamphetamine may be useful in treating prescription stimulant addiction. Mobile medical application: reset			

**Rohypnol® (Flunitrazepam):** A benzodiazepine chemically similar to prescription sedatives such as Valium® and Xanax®. Teens and young adults tend to misuse this drug at bars, nightclubs,

concerts, and parties. It has been used to commit sexual assaults due to its ability to sedate and incapacitate unsuspecting victims.

**TABLE 18: DRUG OF ABUSE: ROHYPNOL**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Circles, Date Rape Drug, Forget Pill, Forget-Me Pill, La Rocha, Lunch Money, Mexican Valium, Mind Eraser, Pingus, R2, Reynolds, Rib, Roach, Roach 2, Roaches, Roachies, Roopies, Rochas Dos, Roofies, Rope, Rophies, Row-Shay, Ruffies, Trip-and-Fall, Wolfies	Flunitrazepam, Rohypnol®	Tablet	Swallowed (as a pill or as dissolved in a drink), snorted	IV** - Rohypnol® is not approved for medical use in the United States; it is available as a prescription sleep aid in other countries
<b>Possible Health Effects</b>				
Short-term	Drowsiness, sedation, sleep; amnesia, blackout; decreased anxiety; muscle relaxation, impaired reaction time and motor coordination; impaired			

Long-term Other Health-related Issues In Combination with Alcohol	mental functioning and judgment; confusion; aggression; excitability; slurred speech; headache; slowed breathing and heart rate. Unknown. Unknown.
Withdrawal Symptoms	Severe sedation, unconsciousness, and slowed heart rate and breathing, which can lead to death. Headache; muscle pain; extreme anxiety, tension, restlessness, confusion, irritability; numbness and tingling of hands or feet; hallucinations, delirium, convulsions, seizures, or shock.
<b>Treatment Options</b>	
Medications	There are no FDA-approved medications to treat addiction to Rohypnol® or other prescription sedatives.
Behavioral Therapies	More research is needed to find out if behavioral therapies can be used to treat addiction to Rohypnol® or other prescription sedatives.

**Steroids (Anabolic):** Man-made substances used to treat conditions caused by low levels of steroid hormones in the body misused to enhance athletic and sexual performance and physical appearance.

**TABLE 19: DRUG OF ABUSE: STEROIDS (ANABOLIC)**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
Juice, Gym Candy, Pumpers, Roids	Nandrolone ( <i>Oxandrin</i> ®), oxandrolone (Anadrol®), oxymetholone (Anadrol-50®), testosterone cypionate (Depo-testosterone®)	Tablet, capsule, liquid drops, gel, cream, patch, injectable solution	Injected, swallowed, applied to skin	III
<b>Possible Health Effects</b>				
	Short-term	Builds muscles, improved athletic performance. Acne, fluid retention (especially in the hands and feet), oily skin, yellowing of the skin, infection.		
	Long-term	Kidney damage or failure; liver damage; high blood pressure, enlarged heart, or changes in cholesterol leading to increased risk of stroke or heart attack, even in young people; aggression; extreme mood swings; anger ("roid rage"); extreme irritability; delusions; impaired judgment.		
	Other Health-related Issues	Males: shrunken testicles, lowered sperm count, infertility, baldness, development of breasts. Females: facial hair, male-pattern baldness, enlargement of the clitoris, deepened voice. Adolescents: stunted growth. Risk of HIV, hepatitis, and other infectious diseases from shared needles.		
	In Combination with Alcohol	Increased risk of violent behavior.		
	Withdrawal Symptoms	Mood swings; tiredness; restlessness; loss of appetite; insomnia; lowered sex drive; depression, sometimes leading to suicide attempts.		
<b>Treatment Options</b>				
	Medications	Hormone therapy		
	Behavioral Therapies	More research is needed to find out if behavioral therapies can be used to treat steroid addiction.		

**Tobacco:** Plant grown for its leaves, which are dried and fermented before use.

**TABLE 20: DRUG OF ABUSE: TOBACCO**

Street Names	Commercial Names	Common Forms	Common Ways Taken	DEA Schedule
None	Multiple brand names	Cigarettes, cigars, bidis, hookahs, smokeless tobacco (snuff, spit tobacco, chew)	Smoked, snorted, chewed, vaporized	Not Scheduled
<b>Possible Health Effects</b>				
	Short-term	Increased blood pressure, breathing, and heart rate.		
	Long-term	Greatly increased risk of cancer, especially lung cancer when smoked and oral cancers when chewed; chronic bronchitis; emphysema; heart disease; leukemia; cataracts; pneumonia.		
	Other Health-related Issues	Pregnancy: miscarriage, low birth weight, stillbirth, learning and behavior problems.		

In Combination with Alcohol Withdrawal Symptoms	Unknown. Irritability, attention and sleep problems, depression, increased appetite.
<b>Treatment Options</b>	
Medications	Bupropion (Zyban <sup>®</sup> ), Varenicline (Chantix <sup>®</sup> ), Nicotine replacement (gum, patch, lozenge)
Behavioral Therapies	Cognitive-behavioral therapy (CBT), Self-help materials, Mail, phone, and Internet quit resources

### Disadvantages of Drug Addiction:

Spend all money	Unhealthy
Risk freedom	Risking life
Hanging with grimy people	Waste gas
Waste time	Waste money
Put yourself in chaotic situations	Feel like crap
Look and feel dirty	Don't sleep for drug
Don't eat for days	Neglect hygiene
Don't pay bills	Look and act stupid
Always paranoid	Hallucinations after a few days
Chronic coughing afterwards	So drained after
Takes forever to come	Down and calm
Having to start over	Shame
Depressed real load	Feeling worthless

**Treatment for Drug Addiction**<sup>4</sup>: There are many options that have been successful in treating drug addiction, including:

1. Therapies.
2. Medication.
3. Medical devices and applications used to treat withdrawal symptoms.

**(A) Therapies:** Therapies used in addiction treatment are based on an individual's health and substance abuse patterns. Options for therapy include an array of individual or group therapy sessions, which addiction counselors typically organize.

### Behavioral Therapies Help Patients:

- Modify their attitudes and behaviors related to drug use
- Increase healthy life skills
- Persist with other forms of treatment, such as medication
- Patients can receive treatment in many different settings with various approaches.

**Outpatient Behavioral Treatment:** It includes a wide variety of programs for patients who visit a

behavioral health counselor on a regular schedule. Most of the programs involve individual or group drug counseling, or both. These programs typically offer forms of behavioral therapy such as:

Cognitive-behavioral therapy helps patients recognize, avoid, and cope with the situations in which they are most likely to use drugs. Multidimensional family therapy developed for adolescents with drug abuse problems as well as their families addresses a range of influences on their drug abuse patterns and is designed to improve overall family functioning through motivational interviewing, which makes the most of people's readiness to change their behavior and enter motivational treatment incentives (contingency management), which uses positive reinforcement to encourage abstinence from drugs

**Inpatient or Residential Treatment:** It can also be very effective, especially for those with more severe problems (including co-occurring disorders). Licensed residential treatment facilities offer 24-hour structured and intensive care, including safe housing and medical attention. Residential treatment facilities may use various therapeutic approaches, generally aimed at helping the patient live a drug-free, crime-free lifestyle after treatment. Examples of residential treatment settings include:

Therapeutic communities are highly structured programs in which patients remain at a residence, typically for 6 to 12 months. The entire community, including treatment staff and those in recovery, act as key agents of change, influencing the patient's attitudes, understanding, and behaviors associated with drug use. Shorter-term residential treatment typically focuses on detoxification and providing initial intensive counseling and preparation for treatment in a community-based setting. Recovery housing provides supervised, short-term housing for patients, often following other types of inpatient or residential treatment. Recovery housing can help people make the transition to an independent life for example, helping them learn how to manage

finances or seek employment, as well as connecting them to support services in the community.

**(B) Medication**<sup>2,3,5</sup>: Medications are available for treatment of opioid (heroin, prescription pain relievers), tobacco (nicotine), and alcohol addiction. Scientists are developing other medications to treat stimulant (cocaine, methamphetamine) and cannabis (marijuana) addiction. People who use more than one drug, which is very common, need treatment for all of the substances they use. In May 2018, the FDA approved lofexidine, a non-opioid medicine designed to reduce opioid withdrawal symptoms

**Opioids:** Methadone (Dolophine®, Methadose®), buprenorphine (Suboxone®, Subutex®, Probuphine®, Sublocade™) and naltrexone (Vivitol®) are used to treat opioid addiction. Acting on the same targets in the brain as heroin and morphine, methadone and buprenorphine suppress withdrawal symptoms and relieve cravings. Naltrexone blocks the effects of opioids at their receptor sites in the brain and should be used only in patients who have already been detoxified. All medications help patients reduce drug-seeking and related criminal behavior and help them become more open to behavioral treatments.

A NIDA study found that once treatment is initiated, both a buprenorphine/ naloxone combination and an extended-release naltrexone formulation are similarly effective in treating opioid addiction. Because full detoxification is necessary for treatment with naloxone, initiating treatment among active users was difficult, but once detoxification was complete, both medications had similar effectiveness.

**Tobacco:** Nicotine replacement therapies have several forms, including patches, spray, gum, and lozenges. These products are available over the counter. The U.S. Food and Drug Administration (FDA) has approved two prescription medications for nicotine addiction: bupropion (Zyban®) and varenicline (Chantix®). They work differently in the brain, but both help prevent relapse in people trying to quit. The medications are more effective when combined with behavioral treatments, such as group and individual therapy as well as telephone quitlines.

**Alcohol:** Three medications have been FDA-approved for treating alcohol addiction; a fourth, topiramate, has shown promise in clinical trials (large-scale studies with people). The three approved medications are as follows:

Naltrexone blocks opioid receptors involved in the rewarding effects of drinking and the craving for alcohol. It reduces relapse to heavy drinking and is highly effective in some patients. Genetic differences may affect how well the drug works in certain patients. Acamprosate (Campral®) may reduce long-lasting withdrawal symptoms, such as insomnia, anxiety, restlessness, and dysphoria (generally feeling unwell or unhappy). It may be more effective in patients with severe addiction.

Disulfiram (Antabuse®) interferes with the breakdown of alcohol. Acetaldehyde builds up in the body, leading to unpleasant reactions that include flushing (warmth and redness in the face), nausea, and irregular heartbeat if the patient drinks alcohol. Compliance (taking the drug as prescribed) can be a problem, but it may help patients who are highly motivated to quit drinking

**(C) Devices:** Devices can help suppress withdrawal symptoms during detoxification. Detoxification is not in itself "treatment" but only the first step in the process. Patients who do not receive any further treatment after detoxification usually resume their drug use. One study of treatment facilities found that medications were used in almost 80 percent of detoxifications (SAMHSA, 2014).

In November 2017, the Food and Drug Administration (FDA) granted a new indication to an electronic stimulation device, NSS-2 Bridge, for use in helping reduce opioid withdrawal symptoms. This device is placed behind the ear and sends electrical pulses to stimulate certain brain nerves.

**CONCLUSION:** Drug use and addiction cause a lot of diseases and disabilities in the world. Recent advances in neuroscience may help improve policies to reduce the harm that the use of tobacco, alcohol and other psychoactive drugs impose on society.

Effective action should take into account the following:

- ❖ Since, the effects of drugs on health vary greatly depending on the type of drug and on the way it is used, the public health response to drug use should be proportional to the health-related harm it causes.
- ❖ The use of psychoactive substances is expected because of their pleasurable effects and social influences. The greater the frequency and amount of drug used, the higher the risk of becoming dependent.
- ❖ Effective public health policies and programmes that address drug dependence and other forms of harmful drug use could significantly reduce the overall health burden of drug use.
- ❖ The risk of becoming dependent on drugs is determined by biological, genetic, psychological, social, cultural, and environmental factors. Currently, it is impossible to predict who will become drug dependent.
- ❖ Drug dependence is a medical disorder, not a lack of willpower or strength of character.
- ❖ Drug dependence and mental illnesses often affect the same individuals. Therefore, it would be useful to integrate research, assessments, and treatments for both disorders.
- ❖ The cost-effective treatment and management of drug dependence can save lives, improve health, and reduce costs to society. Beyond stopping drug use, effective treatment requires changes in the behaviour of users and often the use of substitute drugs.
- ❖ Treatment must be accessible to all in need and the health care sector should provide the most cost-effective treatments.

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