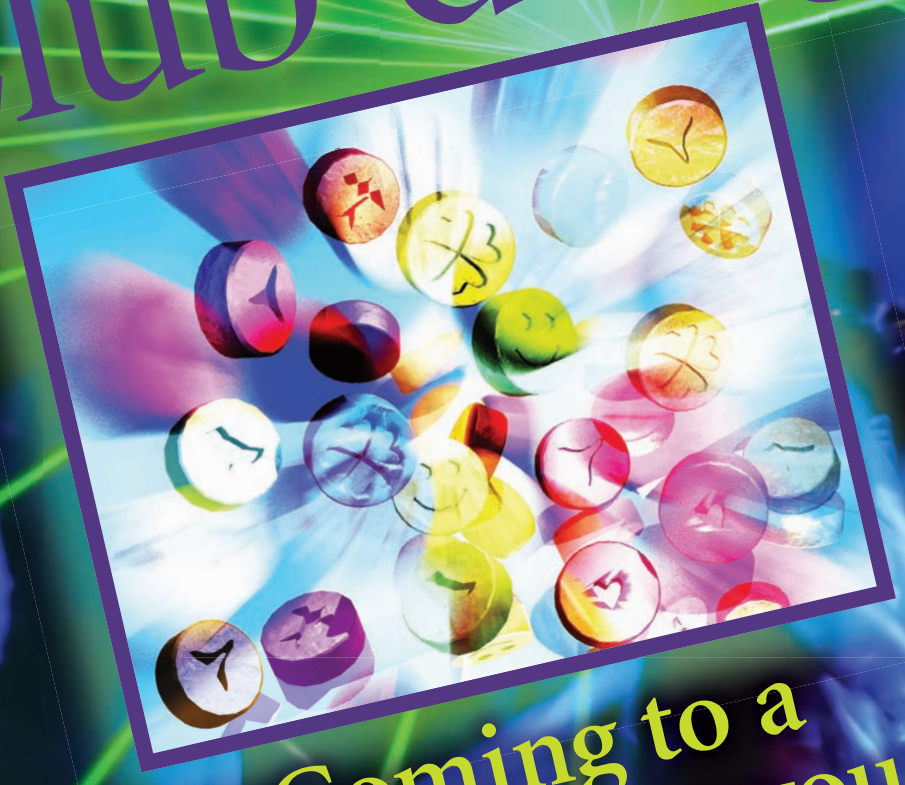
Club drugs



Coming to a patient near you

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An established 25-year-old female patient presents to her primary care provider requesting a rape test. Upon further investigation, the patient reveals that recently, she has felt isolated because she is too "shy" and does not date. She went to a club the night before where another patron handed her a small tablet with the Mercedes Benz emblem on it. Soon after swallowing the tablet, she felt increased self-confidence and was in "such a good mood." A man in the club asked if she wanted to leave to get a bite to eat and the patient states she cannot remember the rest of the night after dinner. She woke up in her own bed with no clothes on and became fearful that something was slipped into her drink and that she may have been raped.

Club drugs have become increasingly popular with young adults and adolescents. Although users report similar effects of these drugs, they are pharmacologically and physiologically different. Understanding these differences and recognizing trends and effects of club drugs is essential for the primary care provider to assist in prevention and treatment efforts.

Keywords: club drugs, ecstasy, GHB, ketamine, LSD, MDMA, methamphetamine, Rohypnol

Abstract: Club drugs have become increasingly popular with young adults and adolescents. Although users report similar effects of these drugs, they are pharmacologically and physiologically different. Understanding these differences and recognizing trends and effects of club drugs is essential for nurse practitioners.

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Flunitrazepam (Rohypnol), LSD, methamphetamine, GHB, MDMA (ecstasy), and ketamine are classified as "club drugs" due to their association with raves and dance clubs. These drugs were initially popular mainly at raves or all-night dance parties with pounding music, flashing lights, and energetic dancing. Used to heighten mood, increase extraversion, and intensify the senses, these drugs have now infiltrated other environments, including workplaces and schools. These drugs are inexpensive and readily available for purchase on Internet sites.

The use of these substances has increased, while the age of users has decreased. According to the Drug Abuse Warning Network, ED visits attributable to club drugs are increasing significantly. In fact, ED visits involving MDMA increased by 123% from 2004 to 2009.[1] ED visits related to gamma-hydroxybutyric acid (GHB), also known as the "date rape" drug, have also increased dramatically since 1994. The average age of people who use these substances is between 18 and 20; however, more than 11 million people in the United States ages 12 or older report having used at least one of these drugs. The 2010 Monitoring the Future study showed that club drug use begins with 8th graders, and the frequency of usage increases among 10th and 12th graders incrementally.[2]

The use of club drugs can cause serious health effects, both short term and long term. (See *Overview of club drugs*.) These drugs are often used at least in combination with other substances, which increases the likelihood of adverse outcomes. Most club drugs are colorless, odorless, and tasteless, making them undetectable when added to beverages. The following is a list of club drugs and their effects on the body.

3,4-Methylenedioxymethamphetamine (Ecstasy)

The synthetic analogue of methamphetamine, 3,4-methylenedioxymethamphetamine (MDMA), acts as both a stimulant and a psychedelic, creating an energizing effect combined with distortions in perception and enhanced enjoyment from tactile experiences.[3] MDMA was initially used in the early 1900s as a parent compound to synthesize other pharmaceuticals. It was explored in the 1970s by psychiatrists as an adjunct to psychotherapy for the treatment of depression and posttraumatic stress disorder due to its empathogenic effects. It was touted as "penicillin for the soul" because it enhanced communication and allowed patients to achieve deeper insights regarding their problems.

It quickly became available on the streets, and in 1985, the U.S. Drug Enforcement Administration banned the drug and emergently scheduled it under the Federal Controlled Substances Act as a Schedule I drug.[4]

MDMA, also known as "ecstasy," "Adam," "X," or "E" is most often taken orally, generally as a tablet or capsule, although it can be crushed into a powder and injected, smoked, or snorted. The tablets often have imprinted logos, such as Nike, Mercedes, Teletubbies, and the Golden Arches of McDonald's.[5] Other drugs that may be chemically similar are sometimes sold as MDMA and, frequently, the tablets may contain other substances. Users have reported using MDMA as part of a multiple drug experience, including marijuana, cocaine, methamphetamine, and sildenafil.[3]

Within an hour of taking a dose, the user begins having effects, such as feelings of mental stimulation, empathy toward others, extroversion, heightened self-confidence, and a general sense of well-being. These effects last up to 8 hours. The stimulatory effects of MDMA allow users to dance or engage in vigorous physical activities for long periods of time. MDMA causes the release of serotonin, norepinephrine, and dopamine, leading to an increase in central monoamine levels.[4] The excess of these neurotransmitters increases body temperature, BP, heart rate, and causes dehydration. These results can be life threatening and require immediate intervention. The drug is metabolized to MDA, a hallucinogenic agent, causing some weak hallucinogenic effects.

Studies in animals have shown neurotoxicity with MDMA use. Large amounts of serotonin are released during its use, causing the brain to become depleted of the neurotransmitter for several days after taking MDMA. This contributes to negative aftereffects, such as depression, memory loss, confusion, and fatigue.[1] In addition, serotonin-containing neurons are damaged, causing those effects to linger for years. These negative aftereffects lead the user to continued use of MDMA (or higher dose usage) in an attempt to gain relief, causing further damage or an overdose of the drug.

MDMA seems to be addictive for some users. Forty-three percent of young adults and adolescent MDMA users met diagnostic criteria for dependence, specifically due to the continued use despite knowledge of physical and/or psychological harm, tolerance, and withdrawal effects.[3] Withdrawal symptoms include loss of appetite, depression, fatigue, and trouble concentrating. No specific treatments exist for MDMA abuse; therefore, educating adolescents and young adults on the harmful effects of the drug may assist in preventing its usage. Although MDMA use is declining, those using it are among the youngest of adolescents using drugs, and it has become more widespread among venues, no longer being used just at raves or dance parties.[6]

Gamma-hydroxybutyrate

In an attempt to find an orally active gamma-aminobutyric acid (GABA) analogue, gamma-hydroxybutyrate (GHB) was synthesized. It is a sedative-hypnotic that has been used

Overview of club drugs

Substance	Street names	Administration	Effects
MDMA	Ecstasy, Adam, clarity, X, E	Swallowed, snorted, injected	Mild hallucinogenic effects, increased tactile sensitivity, empathetic feelings, lowered inhibition, teeth clenching, hyperthermia
GHB	G, Georgia home boy, grievous bodily harm, liquid ecstasy, soap	Swallowed	Drowsiness, nausea, headache, confusion, disorientation, memory loss/unconsciousness, seizures, coma
Flunitrazepam (Rohypnol)	Forget-me pill, Mexican valium, roofies, date rape pill	Swallowed, snorted	Sedation, muscle relaxation, confusion, memory loss, dizziness
Ketamine	K, special K, vitamin K, super acid	Swallowed, smoked, injected	Impaired attention, memory, and learning ability; overdose can cause delirium, amnesia, impaired motor function, and hypertension
LSD	Acid, blotter, blue heaven	Swallowed, absorbed	Altered states of perception, hallucinations, nausea, increased body temperature, increased heart rate, impulsive behavior, flashbacks
Methamphetamine	Meth, ice, crank, crystal, speed	Swallowed, snorted, smoked, injected	Increased heart rate, feelings of exhilaration, increased energy, increased alertness, anorexia, paranoia, dental problems, picking at skin

Adapted from National Institutes of Health. *Commonly-Abused Drugs*; 2010. Retrieved from www.drugabuse.gov.

in general anesthesia.[7] Europe has used GHB for the treatment of alcohol and opioid dependence. The drug was initially available as a dietary supplement in the United States and was attractive to bodybuilders due to reports of increasing growth hormone levels. After reports of adverse events, the FDA ordered the removal of GHB from the market.[8] The prescription drug, sodium oxybate, which is a sodium salt of GHB is available on the U.S. market for the treatment of cataplexy and excessive daytime sleepiness in patients with narcolepsy. The drug can only be dispensed to patients enrolled in the Xyrem Success Program.[9] GHB is usually taken orally, comes in a liquid or powder form, and is odorless and colorless. It has been found in a capsule form and is described as having a salty taste. It quickly affects the central nervous system, causing a euphoric, sedated state. At higher doses, it produces anterograde amnesia, loss of consciousness, and the inability to resist or recall sexual assault.[3] Street names include "liquid ecstasy," "soap," "easy lay," "Georgia home boy," and "grievous bodily harm." Recipes for production can be found on the Internet, with the main ingredients being industrial solvents.

A naturally occurring metabolite of the inhibitory neurotransmitter GABA, GHB is structurally similar to GABA. It interacts with GABA and GABA receptors and affects dopamine release. In low concentrations, GHB stimulates dopamine release, whereas in higher concentrations, dopamine release is inhibited.[7] It has effects on serotonin, acetylcholine, and growth hormone levels. GHB effects occur 15 to 60 minutes after ingestion and last up to 8 hours. It is detectable in the urine for up to 12 hours after ingestion.[7]

Users report feelings of calmness, relaxation, increased ease in socializing with others, and enhanced sexual experiences. Under controlled settings, GHB produces sedation, fatigue, psychomotor retardation, and abnormal posture.[10] Symptoms of overdose include bradycardia, vomiting, somnolence, stupor, and respiratory depression. The combination of GHB with alcohol intensifies the central nervous system depressant effects and can lead to respiratory arrest.

Using GHB repeatedly results in tolerance, and frequent dosing has been associated with dependence.[7] Withdrawal symptoms of GHB range from mild and short-lived, including agitation, anxiety, and insomnia, to potentially life threatening, including tachycardia, delirium, hallucinations, and seizures. There are little data on treatment options for GHB abusers, and it primarily surrounds supportive management.

Rohypnol

Flunitrazepam (Rohypnol) is a potent benzodiazepine formulated for preoperative anesthesia and as a sedative-hypnotic. It acts as a muscle relaxant and, at high doses, can cause a lack of muscle control and loss of consciousness.[3] Flunitrazepam is not legally marketed in the United States but is available in Europe and Latin America, generally brought to the United States by mail.

Flunitrazepam has a long history of abuse by cocaine addicts, and due to its anterograde amnesic properties, it is used to commit sexual assault. Referred to as "Mexican valium," "roofies," the "forget me pill," and the "date rape pill," flunitrazepam quickly causes sedation, inhibition, confusion, hypotension, and amnesia. It is easily soluble in beverages and is tasteless and odorless. The concurrent use with alcohol aggravates the central nervous system depressant effects; overdose can lead to respiratory depression and arrest.[3]

Flunitrazepam comes in small tablets that are inexpensive despite being 10 times more potent than diazepam. Effects occur within 30 minutes of ingestion, peaking at 2 hours. As little as 1 mg can impair an individual for over 8 hours.[5]

GHB is usually taken orally and quickly affects the central nervous system, causing a euphoric, sedated state.

Overdose may be treated cautiously with flumazenil, the benzodiazepine antagonist, but can result in acute withdrawal in patients who are dependent on benzodiazepines.[5] Therefore, treatment is supportive and should include substitution with approved benzodiazepines on a gradual taper.

Ketamine

Ketamine is a rapid-acting anesthetic that has been approved for use in both humans and animals. It is a Schedule III substance and has been used in combination with other agents as a general anesthetic and for moderate sedation. Clinically, ketamine is used more frequently in children than adults because of decreased susceptibility to delirium, and it is most often used by veterinarians.[11] Medically, it is injected I.V. or I.M. When abused, it is used by various routes, such as insufflations, smoked, oral ingestion, and via I.V.

Ketamine is described as a dissociative anesthetic as the patient becomes psychologically disconnected from his or her body while anesthetized. The drug abuse community subsequently caught on to this dissociation, which allows the user to escape from problems and the ability to feel pain. Known as "K," "Special K," "Vitamin K," and "Super Acid," ketamine has the perception among users as being safe because it is made and packaged by pharmaceutical companies.[3]

Acting on glutamate receptors, ketamine produces dose-related effects. Lower dose intoxication results in impaired attention, memory, and learning ability. This is described as falling into a "K-hole," resulting in social detachment and distortions of time and space.[8] This "K-hole" ends abruptly but can be reentered with another dose of ketamine. Although these binges are the most common type of ketamine use, more frequent users have described the development of tolerance and drug cravings.

Overdoses of ketamine cause delirium, amnesia, impaired motor function, and hypertension. Seizures and fatal respiratory problems have been identified, and the use of additional substances increases potential for death. Treatment for overdose is supportive, generally requiring mechanical ventilation and cardiovascular support.

Lysergic acid diethylamide

Lysergic acid diethylamide (LSD) is classified as a hallucinogenic and is one of the most potent mood-altering chemicals. It is manufactured from ergot, a fungus that grows on rye and other grains. Accidentally discovered, its potency was quickly recognized and was hoped to be used to study psychosis and schizophrenia.[4] Exploration of mind-altering substances rose in the 1960s, but human investigations were halted in 1970 with the Controlled Substances Act. Despite the prohibition of human studies with LSD type substances, the development of illegal agents rose dramatically.

The effects of LSD have been classified into three categories: perceptual, psychic, and somatic. The perceptual effects include altered shapes and colors and heightened senses. Depersonalization, hallucinations, alteration in mood, and prolonged sense of time describe the psychic effects. Somatically, the user may have nausea, vomiting, blurred vision, dizziness, and tremors.[4]

LSD is absorbed in the gastrointestinal tract and diffused to all organs. Onset of effects occurs within 60 minutes and peaks in 2 to 4 hours. The user returns to a predrug state after 10 to 12 hours. LSD binds at serotonin receptors and behaves as a serotonin agonist. Pupils become dilated, body temperature, heart rate, and BP increase, and LSD also causes loss of appetite, sweating and sleeplessness.[1,8]

Flashbacks, or brief episodes of a previous hallucinogenic drug experience, are associated with LSD. These re-experiences of LSD's perceptual effects can lead to considerable anxiety and may be accompanied by somatic and emotional components of the original experience. Flashbacks are generally brief, self-limited, and do not require treatment.

LSD use dramatically escalated in 2000 and has declined ever since. Of all club drug users, LSD users are the youngest and tend to be male.[6] LSD use is often associated with alcohol, marijuana, cocaine, and ecstasy. In addition, LSD overdose is rare without concurrent use of another substance.[6]

Resources on club drug use

- National Institute on Drug Abuse
  www.drugabuse.gov/drugs-abuse/club-drugs
- National Criminal Justice Reference Service
  www.ncjrs.gov/spotlight/club_drugs
- Club Drugs: Facts, Street Names, Effects, Dangers
  www.emedicinehealth.com/club_drugs/article_em.htm
- National Library of Medicine
  www.nlm.nih.gov/medlineplus/clubdrugs.html

Methamphetamine

Methamphetamines are central nervous system stimulants affecting dopamine production and activation of the sympathetic nervous system. This class of drug is commonly misused in the United States and is more common in the western half of the country.[8] Methamphetamine has different forms and names: "speed" is often a colored powder, "pills" are tablets (either pharmaceutical grade, such as methylphenidate or methamphetamine powder compressed into a tablet); "ice," "tweak," or "crystal meth" have been soaked in a solvent that evaporates and leaves crystals.[8]

Administration routes vary with methamphetamine use. Smoking the substance causes rapid absorption and can result in central nervous system effects within seconds. When taken I.V., effects are felt in approximately 5 minutes. Intranasal and oral routes have a slower absorption, onset of effect, and decreased elimination time.[12]

The increased dopamine and catecholamine activity creates an initial rush, followed by increased energy, alertness, social ability, insomnia, and anorexia. The highs can last up to 20 hours, and many users report staying awake for days at a time. Methamphetamine is associated with a high addiction rate, and users report cravings after just one use. Prolonged use can lead to a psychotic-like state that includes hallucinations, memory loss, inhibitory control, and obsessively picking at the skin. These effects can last for years after the individual discontinues use. Withdrawal is not generally life threatening and has symptoms opposite of the drug's stimulant effects, such as depressed mood, anhedonia, fatigue, and decreased concentration. Paranoia and psychosis are common during acute withdrawal syndromes, generally lasting 3 to 5 days.[3]

Overdose of methamphetamine causes a sympathetic reaction. Symptoms may include excessive sweating, tachycardia, nausea, pupil dilation, and respiratory distress.

Treatment for overdose requires cardiovascular and respiratory support as well as stroke and seizure precautions.[5]

Being familiar with signs and symptoms associated with club drugs can assist the clinician in identifying substances being used. (See *Resources on club drug use*.) It is important to remember that different substances affect individuals in different ways. Furthermore, by having an awareness of the setting as well as the reasons individuals use them may assist in educating patients in regards to the dangers of use. The opening scenario described a patient who was well known by the nurse practitioner (NP), one whom the NP may not have been suspicious toward drug use. Understanding the effects of club drugs and developing strategies to communicate with patients will increase awareness of serious effects and may contribute to decrease in club drug use.

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The author and planners have disclosed that they have no financial relationships related to this article.

DOI-10.1097/01.NPR.0000443227.72357.72