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DRUGS

Short- and Long-Term Effects and Withdrawal Symptoms

A pharmaceutical preparation or a naturally occurring substance used primarily to bring about a change in an existing process or state (physiological, psychological or biochemical) can be called a **drug**. In simpler terms, any chemical that alters the physical or mental functioning of an individual is a drug.

A drug may or may not have medical uses; its use may or may not be legal. The use of a drug to cure an illness, prevent a disease or improve health is termed 'drug use'.

But when a drug is taken for reasons other than medical, in an amount, strength, frequency or manner that causes damage to the physical or mental functioning of an individual, it becomes 'drug abuse'. Any type of drug can be abused; drugs with medical uses can also be abused. Illegal drugs like brown sugar and ganja have no medical use at all. To use them, is to abuse them. It is drug abuse from the very beginning.

Drug abuse leads to **drug addiction** with the development of tolerance and dependence.

Tolerance refers to a condition where the user needs more and more of the drug to

experience the same effect. Smaller quantities, which were sufficient earlier, are no longer effective and the user is forced to increase the amount of drug intake.

Slowly, drug **dependence** develops. Some drugs produce only psychological dependence while others produce both physical and psychological dependence.

Psychological dependence is a state characterized by emotional and mental preoccupation with the effects of the drug and a persistent craving for it. As psychological dependence develops, the user gets mentally 'hooked' on the drug.

When physical dependence develops, the user's body becomes totally dependent on the drug. With prolonged use, the body becomes so used to functioning under the influence of the drug, that it is able to function normally only if the drug is present.

After the user becomes dependent, if the intake of drugs is abruptly stopped, **withdrawal symptoms** occur. In a sense, the body becomes 'confused' and 'protests' against the absence of the drug. The withdrawal symptoms may range from mild discomfort to convulsions, depending





on the type of drug abused. The intensity of withdrawal symptoms depends on the physical condition of the user, the type of drug abused, the amount of drug intake and the duration of abuse.

Symptoms of drug withdrawal are usually the opposite of the effects produced by the presence of the drug in the body. For example, brown sugar intake causes

constipation, while one of its withdrawal symptoms is diarrhea. Such problems make it difficult for the user to give up drugs. He wants to avoid unpleasant withdrawal symptoms; and to avoid them he must keep on abusing the drug. The user is thus forced to continue drug abuse even if (or when) he knows that the drug is hurting him.

Classification of Addictive Drugs

Substances that are abused can be studied under seven major categories:

- Narcotic analgesics
- Cannabis
- Depressants
- Hallucinogens
- Stimulants
- Volatile solvents
- Other drugs of abuse.

Note: For a long time cannabis was classified as a hallucinogen. But since a few effects such as flashbacks do not occur with cannabis, a separate category was created.

NARCOTIC ANALGESICS

In Greek the prefix 'narco' means 'to deaden' or 'benumb'. 'Analgesic' means 'pain killing or pain-relieving'. In medical terms, 'narcotic' refers to opium and opium derivatives as well as to synthetic substitutes that produce opium-like effects.

All narcotic analgesics share the common property of numbing and thus relieving pain. They are painkillers with high addictive potential. Certain narcotic analgesics are clinically employed for other actions such as suppression of cough and control of diarrhea.

Drugs belonging to this category can be studied under three broad categories:

narcotics of natural origin, semi-synthetic narcotics and synthetic narcotics. Drugs belonging to the first two categories are referred to as **opiates** while synthetic narcotics are known as **opioids**.

Narcotics of Natural Origin

The poppy plant, *Papaver somniferum* is the source of naturally occurring narcotics. For thousands of years this plant has been widely cultivated for the pleasurable effects of its products. Today, its cultivation has been restricted by law.

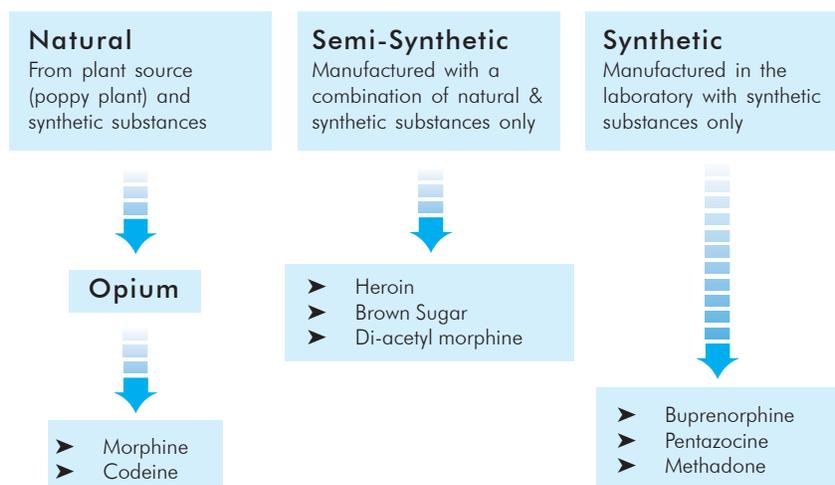
Opium

The word 'opium' is derived from the Greek word 'opion', meaning 'poppy juice'. Opium





Narcotic Analgesics



is obtained by tapping the milky fluid from unripe poppy pods. The fluid is a dark brown or dark grey tar-like substance with a musty odor. It is usually sold in the form of small balls, lumps or bricks.

Routes of administration

- **Oral:** Opium is primarily taken orally. Dried opium is usually boiled in water and the solution is drunk. Consuming it this way is a relatively inefficient route of administration and the effects felt are mild.
- **Inhalation:** Opium can also be smoked. A special piece of equipment (sometimes simple but generally elaborate) is used by opium smokers. It is smoked in the reclining posture to reduce the feeling of nausea. The infamous 'opium dens' of yesteryears are non-existent today. Opium is now smoked by people alone or in groups, in their own houses or other private spaces.

Morphine

Morphine is the principal alkaloid (organic

compound) that is extracted from opium. About 10-15% of the substance extracted from opium is morphine. Morphine is one of the most effective drugs for relief of pain. It is still used medically.

Route of administration

- **Injected:** subcutaneously (under the skin), intramuscularly (into muscle) or intravenously (into veins). Most morphine addicts use the intravenous route.

Codeine

Codeine is another alkaloid found in opium, though in a smaller percentage than morphine (1-2%). Codeine is medically used as a cough-suppressant. Cough syrups containing Codeine are now being abused in many parts of India.

Route of administration

- **Oral:** Medical preparations of codeine are usually made in combination with other chemicals and are available in the form of tablets and syrups.



Semi-Synthetic Narcotics

Heroin / Brown Sugar

Heroin is a semi-synthetic derivative of the drug morphine. Pure heroin is a white crystalline powder and is referred to as 'white sugar' by abusers. When the quality of heroin is poor, its color is no longer white, but brown; this inferior quality is called 'brown sugar'.

Routes of administration

- ▶ Injected: The drug is mixed with distilled water and lime or vitamin C tablets. The solution is then heated and filtered, using cotton to remove the sediments. Later, it is injected intravenously. The subcutaneous route is rarely used. Among intravenous users, an immediate high (rush), described as being akin to an orgasm, is reported.
- ▶ Inhalation: Smoked with tobacco in cigarettes.
- ▶ Chased: The drug is sprinkled on a silver foil or placed in a bent spoon and heated from beneath with a matchstick or a candle. The thick fumes which rise are taken in through the mouth with a rolled piece of paper.

In general, brown sugar is not taken orally. Narcotic analgesics, being alkaline in nature, are not absorbed in the acidic medium of the stomach. It is estimated that about 90% of the effect is lost when taken orally.

Synthetic Narcotics

Synthetic narcotics are produced only in the laboratory. Buprenorphine and pentazocine are the most widely abused synthetic narcotic drugs.

Buprenorphine and Pentazocine

Both are synthetic narcotic analgesics which are used as painkillers in a wide variety of medical conditions.

Buprenorphine (Tidigestic) was initially used to treat the withdrawal symptoms of heroin addiction, as well as in the treatment of cancer. Later, it became a drug of abuse.

Routes of administration

- ▶ Oral: Administered orally in the form of tablets.
- ▶ Injected: Subcutaneously, intramuscularly or intravenously. Addicts almost always inject the drug intravenously.

Metabolism

Absorption and Distribution

Narcotic analgesics are not absorbed evenly by all the parts of the body. They concentrate in the tissues, especially in the kidneys, liver, skeletal muscle, lungs and spleen. All the chemicals in the blood do not enter the brain. The tissues surrounding the brain act as a protective mechanism (called the blood brain barrier or BBB) that selectively filters the chemicals entering the brain. So, only small amounts of narcotic analgesics cross the BBB but the central nervous system is so sensitive that even minute amounts are sufficient to cause a pharmacological effect. In pregnant women, small quantities of the drug cross the placental barrier and fetal dependency can develop.

Excretion

Excretion of narcotic analgesics is largely through urine. A small amount passes through the lungs and bile.

Short-Term Effects of Narcotic Analgesics

When injected, the effects of narcotic analgesics are immediate and pronounced. With other routes of administration, the effects are felt only gradually.

The main effects include:

- a short-lived state of euphoria during which feelings of hunger and pain are not felt
- mental clouding, impairment of intellectual processes
- drowsiness, sedation, apathy, decreased physical activity.

A few other adverse reactions may also appear:

- vomiting in novice users
- dysphoria (a feeling of unpleasantness)
- inability to concentrate
- itchy skin
- constipation
- constriction of pupils (with the exception of synthetic narcotics).

After the initial effect wears off, there is increased sensitivity to pain.

Severe overdose of heroin results in very slow, shallow, irregular breathing, marked decrease in blood pressure, cyanosis (body becomes cold and bluish) and coma. In extreme cases, death can occur due to respiratory arrest or cardiovascular complications.

System Effects

Central Nervous System

- Pin-point (constricted) pupils, droopy eye-lids, reduced sharpness of vision

- Decrease in REM sleep (rapid eye movement — the rapid, jerky movements of the eye which occur during certain stages of the sleep cycle when dreams occur. The REM stage of the sleep cycle is most beneficial to the body as the body is most relaxed at that time.)

Respiratory System

- Respiratory depression due to the effect on the respiratory center in the brain. The rate of respiration is reduced and breathing is slow and shallow.

Cardio-Vascular System

- Decrease in the heart rate (Bradycardia)
- Dilation of peripheral blood vessels, which shows up as flushing
- Hypotension or low blood pressure.

Gastro-Intestinal Tract

- Constipation and poor appetite.

Kidneys

- Mild decrease in urine formation.

Long-Term Effects

Mood instability, reduced libido, constipation, constriction of pupils (which affects night vision) and certain types of respiratory impairments can develop. In female drug abusers, menstrual irregularity usually occurs.

In addition, the following complications can develop:

- Serum hepatitis/HIV/AIDS caused by use of infected needles
- Fetal addiction can develop. 80% of babies born to addicted mothers

develop withdrawal symptoms such as hyperactivity, irritability, tremors, regurgitation, poor feeding and diarrhea. Convulsions may also occur. These children usually have low birth weights.

Tolerance and Dependence

Increasingly higher doses are required to produce satisfactory analgesic (pain relieving), sedative and euphoric effects. Tolerance also develops to its respiratory-depressant and nausea inducing effects. However, tolerance does not develop to the pupillary constricting or constipating effects.

As tolerance develops with chronic use, the user gradually increases the dosage to achieve the desired effect. A dosage plateau is reached where no amount of the drug is sufficient to produce the intensity of effects desired. The user, however, continues the use of the drug to delay withdrawal symptoms.

Severe physical and psychological dependence develops. Abrupt cessation of drug use leads to withdrawal symptoms.

Withdrawal Symptoms

With the deprivation of narcotic analgesics, the first withdrawal symptoms are usually experienced shortly before the time of the next scheduled dose. The initial symptoms resemble those of a fairly severe bout of influenza. Symptoms such as watery discharge from eyes and nose, yawning and perspiration appear about 8 to 12 hours after the last dose. Restlessness, irritability, loss of appetite, goose flesh, tremors, and dilation of pupils also occur. Thereafter the addict may fall into a restless sleep. Withdrawal symptoms

intensify and reach their peak between 48 and 72 hours after the last dose. Nausea and vomiting occur. Stomach cramps and diarrhea are common. Heart rate and blood pressure are elevated. Chills alternating with flushing and excessive sweating are also characteristic symptoms. Excruciating pain in the bones and muscles of the back and extremities occur, as do muscle spasms and kicking movements. At this time the individual may develop suicidal tendencies.

Narcotic withdrawal is usually not life threatening, although a marked electrolyte imbalance caused by excessive vomiting and diarrhea must be watched for.

Delirium occurs in drug withdrawal only in the case of severe infection anywhere in the body.

CANNABIS

Cannabis drugs are made from the Indian hemp plant — *Cannabis sativa*. This plant has been cultivated for centuries in many parts of the world for the tough fiber of its stem and for the plant's psychoactive properties. When its mind-altering properties came to light, the cultivation of cannabis was banned. Its therapeutic potential and possible medicinal properties are being studied. As of now, cannabis drugs do not have any medical use.

More than 60 constituents, known as cannabinoids, occur naturally in, and only in, the cannabis plant. The chief psychoactive substance among them is delta-9-tetra-hydrocannabinol, commonly referred to as THC.

The main drugs under this category include the following.

Ganja/Marijuana

Ganja is prepared from the dried leaves and flowering tops of the plant. Ganja is commonly referred to as grass, pot or stuff. It may range in color from grayish-green to greenish-brown and in texture from a dry, leafy material to a finely divided tea-like substance.

Route of administration

Ganja is usually smoked in the form of hand-rolled cigarettes ('joints' or 'reefers') or pipes specially made for this purpose. It is mixed with tobacco and smoked. The proportion of ganja and tobacco is altered according to the need and desire of the user.

Hashish/Charas

The cannabis plant has separate male and female forms. The female plant secretes a sticky resin which has a high THC concentration. The resinous secretion of the cannabis plant, which is collected and dried, is known as Hashish/Charas.

Hashish ranges in color from light brown to almost black, and the THC content in hashish ranges from 5 to 15%.

Route of administration

Hashish is smoked like ganja and sometimes baked with food and eaten.

Hashish Oil

Hashish oil is produced by a process of repeated extraction of the resin of the cannabis plant to get a high concentration of THC. It is highly potent with a THC concentration ranging from 20 to 60%. Hashish oil is a dark viscous liquid.

Route of administration

It is usually dripped on cigarettes and smoked.

Bhang

This is the least potent of all cannabis drugs. Bhang contains the dried parts of the plants — leaves and stem. Bhang is a brown leafy material with dried twigs mixed in it.

Route of administration

Bhang is usually brewed with tea or milk and drunk.

Metabolism

Absorption and Distribution

When cannabis drugs are smoked, less than 50% of the THC is absorbed and enters the blood circulation. The effects are felt within minutes. The effects peak after 10-30 minutes and cease after 2-4 hours.

When taken orally the effects are felt after 1 hour, the peak is reached only after 5-6 hours, and the effect lasts for about 10 hours. Users prefer to smoke the drug, because it is about three times more potent as compared to the effects from the oral route of administration.

Excretion

The THC in the blood is metabolized by the liver into water-soluble compounds so that it can be excreted. Some of the metabolites (products of the metabolism) are also psychoactive.

Certain organs like the brain, spleen and other fat tissues absorb THC and store it. Gradually, the THC is released back into the blood stream to be metabolized by the liver. That is why THC metabolites can be present in the urine from one week up to a month after the last intake of cannabis.

Short-Term Effects of Cannabis

The exact effects that cannabis drugs produce cannot be accurately predicted. The prior experience and expectation of the user, the potency of the drug etc. are important factors that produce the psychoactive effect. The main effects include:

- ▶ mild euphoria followed by a dreamy state of relaxation
- ▶ lowering of inhibitions, spontaneous laughter
- ▶ increased auditory and visual acuity (e.g. sound seems louder and clearer, vision seems brighter and sharper)
- ▶ sense of smell, touch and taste are often enhanced
- ▶ altered sense of time perception or 'time constant effect' (time seems to pass more slowly)
- ▶ impaired short-term memory, reduced attention span, poor concentration and disturbed thought patterns
- ▶ impaired ability to perform complex motor tasks
- ▶ splitting of consciousness — the user experiences the 'high', while at the same time becomes an objective observer of his own intoxication. He may have paranoid thoughts, and yet simultaneously laugh at them.

Some users experience a 'bad trip' which includes adverse reactions like mild paranoia, fear, anxiety, or even panic. Nausea, vomiting and dizziness may occur. 'Synesthesia' (melding of two sensory modalities) can occur with high doses. The user may feel that he can hear colors or see music.

In addition to these effects on the central nervous system, the following effects are also noticed.

System Effects

Respiratory System

- ▶ Irritation of the mucosal membranes lining the respiratory system.
- ▶ Broncho dilation — the network of minute tubes through which air enters the lungs dilate.

Cardio-Vascular System

Tachycardia (increased heart beat) is very prominent. Due to dilation of blood vessels in the conjunctiva, reddening of the eyes can be noticed. There is also fall in blood pressure.

Gastro-Intestinal System

- ▶ Increased appetite for sweets.

Long-Term Effects

- ▶ Pronounced psychological dependence is particularly high among users with emotional problems.
- ▶ Amotivational syndrome: The user may lose all interest in his work, family etc. He may become so apathetic that he is not interested in any goal-oriented activity.
- ▶ Psychosis: Typical, acute psychotic episodes characterized by confusion, delusion, hallucinations, disorientation and paranoid symptoms may occur.
- ▶ Frequent long-term cannabis use may produce bronchitis, asthma, sinusitis, or chronic redness of the eyes because of its irritant effect.
- ▶ Sterility: There is evidence to indicate that prolonged use can reduce the

sperm count and decrease sperm motility.

- ▣ Children born to a mother who smoked cannabis during pregnancy may have low birth weight or might be mentally retarded.
- ▣ Ongoing studies have revealed some evidence that cannabis use reduces immunity by impairing a component of the white blood cell defense system. It is also speculated that smoke from cannabis increases the risk of cancer.

Tolerance and Dependence

Frequent and regular users of high doses develop tolerance to the drug. To maintain intensity of effects, users increase their daily dose. Original sensitivity can be restored with abstinence for several days.

Physical dependence on cannabis develops only in high dose users. Strong psychological dependence develops with the regular user. The user acquires a persistent craving for the drug which thus begins to play a central role in his life. Even if cannabis is temporarily unavailable, anxiety or feelings of panic may ensue.

Withdrawal Symptoms

Abrupt cessation of cannabis use leads to withdrawal symptoms — sleep disturbances (sometimes with recurrent nightmares), loss of appetite, irritability, nervousness, anxiety, sweating and stomach upset. Some times chills, increased body temperature and tremors develop. Depression and other psychotic symptoms may become prominent. Withdrawal symptoms usually last for less than a week.

DEPRESSANTS

Depressants are drugs which depress or

slow down the functions of the central nervous system. The drugs which come under this category include:

1. Sedative-hypnotics
2. Alcohol.

Sedative-Hypnotics

Sedative-hypnotics are depressant drugs whose primary effects are calming, sedating or inducing sleep. Barbiturates like Methaqualone (common name: Mandrax), Secobarbital and Amylobarbitol (Vesparax), and Benzodiazepines like Diazepam (Valium, Calmpose) and Lorazepam (Ativan) are the commonly abused drugs.

Routes of administration

Sedative-hypnotics are administered orally in the form of tablets or capsules. They can also be injected — subcutaneously, intravenously or intramuscularly.

Alcohol

Alcohol is a clear, thin liquid, with a harsh burning taste. It is the product of fermentation and distillation. Ethyl alcohol (C₂H₅OH) is the intoxicating substance present in alcoholic beverages like beer, whisky, rum, brandy, wine, etc. It supplies empty calories — calories without any nutritive value whatsoever. While enough energy is available for functioning, the nutrients necessary for tissue repair and building up the body are not available.

Route of administration

- ▣ Taken orally.

Metabolism of Alcohol

Absorption and Distribution

Unlike other food, alcohol does not need digestion. It is rapidly absorbed into the

blood stream from the stomach and small intestine. From here, it is carried to almost all the organs including the brain.

The absorption rate depends on various factors like the type and concentration of alcohol in the beverage and presence of food. The body weight, previous experience with drinking and the emotional state prior to drinking can influence the effect.

Excretion

In the liver, alcohol undergoes the process of oxidation whereby it is changed into carbon dioxide and water and energy is released. The waste products are excreted through the urine and a small amount of alcohol is excreted unchanged through the lungs.

Short-Term Effects

Intake of 1-2 drinks (1 drink = 30 ml.) of whisky/brandy depresses the higher centers in the brain. Inhibitions are thus lowered. The user feels more relaxed and seems to be able to talk more freely. As more alcohol is consumed, fine motor coordination is affected, reaction time increases and judgment becomes poor. This is what makes driving under the influence of alcohol a dangerous activity. As the alcohol content in the blood continues to increase, more and more centers in the brain are affected. Gradually, blurred or double vision, slurred speech and staggering gait develop. If he continues to drink, he loses consciousness.

System Effects of Alcohol Abuse

Central Nervous System Changes

➤ Wernicke-Korsakoff syndrome characterized by disorientation, peripheral nerve damage, loss of muscular

coordination, involuntary, horizontal rapid eye movements and confabulation (contriving stories to fill in gaps in memory)

➤ Alcohol dementia (disturbances in thought and memory).

Other Effects

➤ Gastro-intestinal problems include gastritis, peptic ulcer and cancer.

➤ Fatty liver, hepatitis and cirrhosis. There is also an increased likelihood of liver cancer.

➤ Pancreatic effects include pancreatitis, diabetes.

➤ Muscle weakness and wasting are commonly seen.

➤ Cardio-vascular effects of alcohol include damage to the heart muscles.

➤ Blood cells (both red and white) and platelets are affected.

➤ Kidney problems include diuresis and gout.

➤ Sexual dysfunction both in males and females.

Short-Term Effects of Depressants

Sedative-hypnotics produce effects that are similar to those of alcohol. The main effects include:

➤ relief from anxiety and tension

➤ euphoria (usually with barbiturates)

➤ lowering of inhibitions

➤ sedation, sleep with larger doses

➤ poor motor coordination (especially for fine motor tasks)

➤ impaired concentration and judgment

➤ slurred speech and blurred vision.

Nausea and abdominal pain may develop. The user may become hostile. Large doses can cause irregular breathing, weak pulse. Coma and death due to overdose can occur, and occurs with a combination of sedative hypnotics and alcohol.

Long-Term Effects of Depressants

Long-term use can produce depression, chronic fatigue, respiratory impairments, impaired sexual function, decreased attention span, poor memory and judgment. Chronic sleep problems may develop. Reduced REM sleep due to drug use makes the quality of sleep so poor that the user does not feel rested on waking up.

Tolerance and Dependence

Tolerance does not develop uniformly for all effects induced by these drugs. With barbiturates, tolerance to the sleep inducing effect develops very rapidly, often within a week or two of regular use. In the case of benzodiazepines, chronic use leads to tolerance of the effects of relieving anxiety and tension.

Cross-tolerance to other drugs of the depressant class also develops (i.e. if a user who has developed tolerance to one of these drugs ingests another in a dosage which would otherwise be sufficient to produce a certain effect, the desired effect will not be felt).

Physical and psychological dependence develop. Craving, anxiety or even panic is common if the user is temporarily unable to obtain supply of the drug.

Withdrawal Symptoms

Withdrawal symptoms like anxiety, insomnia, weakness and nausea are usually noticed. With very high and chronic use,

agitation, high body temperature, delirium, hallucinations and convulsions develop.

HALLUCINOGENS

Hallucinogens are drugs that dramatically affect perception, emotions and mental processes. Since they distort the perception of objective reality and produce hallucinations, they are known as 'hallucinogens', and are also referred to as 'psychedelic' (mind-altering) drugs.

Hallucinogens include a wide variety of substances ranging from wholly synthetic products to naturally occurring substances. Hallucinogenic drugs are very rarely available in India, making it the least abused class of drugs. The most common hallucinogenic drugs are listed below.

LSD (Lysergic acid diethylamide)

LSD is a semi-synthetic drug and the most powerful hallucinogen. It is produced from lysergic acid, a substance derived from the ergot fungus which grows on rye, or from lysergic acid amide, a chemical found in morning glory seeds. LSD's only legal use is as a research tool to study the mechanism of mental illness. It has no medical use. The drug is a white, odorless, crystalline material, which is soluble in water.

Routes of administration

LSD is easily absorbed orally and is usually taken in the form of tablets. In the case of LSD blotting papers, they are dissolved in water and are absorbed. A piece of this paper is torn off, placed under the tongue and sucked.

PCP (Phencyclidine)

PCP is a synthetic drug produced only in clandestine laboratories. It is commonly

called 'angel-dust'. In its pure form PCP is a white crystalline powder that readily dissolves in water.

Routes of administration

It is snorted, smoked, eaten and, though rarely, taken intravenously.

Mescaline

Mescaline is derived from a type of cactus and is also produced synthetically. Mescaline appears as a white or colored powder.

Route of administration

The oral route of administration is most common.

Psilocybin

Psilocybin is chiefly derived from the 'psilocybe' mushroom. The drug can be synthetically produced with great difficulty. Crude mushroom preparations containing psilocybin are usually sold as dried mushrooms.

Routes of administration

This drug is well absorbed orally. The mushrooms itself may be eaten, or dried, powdered and smoked.

Short-Term Effects of Hallucinogens

The physical effects produced and perceptual effects created differ from one drug to another. The main effects include:

- ▶ alterations of mood — usually euphoric but sometimes severely depressive
- ▶ distortion of the sense of direction, distance and time (e.g. passage of a few minutes may seem like hours)
- ▶ intensification of the sense of vision.

Color and texture of items become more vivid and perception of details increases

- ▶ 'psuedo' hallucinations; 'pseudo' because the user knows that the experience is not true, e.g. seeing a myriad of colors or bizarre images
- ▶ synesthesia (melding of two sensory modalities). User may feel he can see music, hear colors, etc.
- ▶ feelings of depersonalization, loss of body image and loss of sense of reality (the user may feel that his body is shrinking or becoming weightless)
- ▶ sense of the past, present and future may be jumbled. Concentration becomes difficult and attention fluctuates rapidly
- ▶ vague ideas and extreme preoccupation with philosophical issues are common. The great truths and insights the user believes that he has discovered are unintelligible or nonsensical to those not under the influence of LSD.

Hallucinogens are, however, unpredictable; the effects could be different each time a hallucinogen is used. Acute panic reactions can also be produced, resulting in a 'bad trip'. Acute anxiety, restlessness and sleeplessness are common until the effect of the drug wears off. Self-destructive behavior due to rash decisions and accidents due to impaired judgment are common.

Long-Term Effects

- ▶ 'Flashbacks' or spontaneous recurrences of an LSD experience can occur without warning for up to a year after LSD use. The exact

mechanism of this effect is not known. The user may experience effects such as intensification of color, apparent movement of a fixed object or other hallucinations even after abstinence for a few months.

- Amotivational syndrome: The user becomes very apathetic, is very passive and shows no interest in life.
- LSD-precipitated psychosis: Acute panic reactions can occur, and may lead the user into a state of drug-induced psychosis. It may resemble paranoid schizophrenia in many respects, with hallucinations (mainly visual), delusional thinking and bizarre behavior. The psychotic episode normally lasts for several hours but in some cases the psychosis may last for years.

Tolerance and Dependence

Tolerance develops very quickly and disappears rapidly after use is discontinued. Due to rapid development of tolerance, most users discontinue use of the drug at least for a while, to regain original sensitivity and effects.

Psychological dependence does develop, though the user does not become physically dependent. Particular withdrawal symptoms are not reported.

STIMULANTS

Stimulants are drugs which excite or speed up the central nervous system. The two most prevalent stimulants are nicotine, found in tobacco products, and caffeine, the active ingredient in coffee and tea. These, however, will not be discussed here. The more potent stimulant

drugs will be the focus of attention. They include amphetamines and cocaine.

Amphetamines

Amphetamines are synthetic drugs produced entirely within the laboratory and they do not occur naturally. They are used in other countries to treat narcolepsy (an uncontrollable tendency to sleep) and sometimes in weight control programs. Ecstasy is an amphetamine-based drug currently being abused in developed countries.

Amphetamines were abused in India in the late 1970s by

- Students: to ward off sleep, enabling them to study through the night prior to an examination, and
- Athletes: to mask feelings of fatigue and increase their endurance.

Route of administration

- Oral: Amphetamines are absorbed orally and are taken in the form of tablets or capsules.

Cocaine

Cocaine, a potent stimulant of natural origin, is extracted from the leaves of the coca plant (*Erythroxylon coca*). It is a odorless, white crystalline powder, with a bitter numbing taste.

Cocaine was formerly used in eye, nose and throat surgery because of its ability to anaesthetize tissues and simultaneously constrict blood vessels and limit bleeding. It is no longer used medically.

Crack

This is made from cocaine and is widely abused in developed countries like the USA. Since cocaine/crack is extremely expensive it is abused by relatively few people in India.

Routes of administration

- Oral: The leaves of the coca plant are sometimes chewed, and cocaine, the chief psycho-motor chemical present, is absorbed through the mucous membranes of the mouth. Very rarely, cocaine is injected for a heightened effect.
- Snorted: It is usually 'snorted', or taken in through the nasal passages (like snuff).

Short-Term Effects of Stimulants

Amphetamines and cocaine have different mechanisms of action, but the overall impact is the same and their effects parallel each other.

The main effects include:

- a heightened feeling of well-being, euphoria
- a sense of super-abundant energy, increased self-confidence
- increased speech and motor activity
- suppression of appetite (which is why it is used in diet pills)
- an increased wakefulness that masks feelings of fatigue (the reason why amphetamines are abused by students during examinations)

Dilation of pupils, dryness of mouth, reduced gastrointestinal activity and urinary retention are other effects, as are increased respiration, heart rate and blood pressure. Anxiety and panic may set in. Temporary impotence may develop. In rare cases, sudden death may occur.

With large doses, very rapid heartbeat, hypertension, headache, profuse sweating, severe agitation and tremors may occur. Very high doses cause rapid,

irregular and shallow respiration, convulsions and coma.

Long-Term Effects

Chronic sleep problems, poor appetite, high blood pressure, rapid and irregular heartbeat, impotence, mood swings, anxiety and tension states are the long-term effects of stimulant abuse. Acts of violence, homicide and suicide rates among stimulant abusers are high.

Chronic use may produce 'amphetamine psychosis'; paranoid ideations, hallucinations and purposeless stereotyped behavior may develop. A full-blown amphetamine psychotic state closely resembles paranoid schizophrenia.

Snorting of cocaine may result in perforation of the nasal septum.

Tolerance and Dependence

Stimulants produce both physical and psychological dependence. As the intensity of the pleasurable effects is high, strong psychological dependence also develops. Tolerance does develop to a certain extent.

Withdrawal Symptoms

Withdrawal symptoms do occur; though the clinical picture does not include major grossly observable physiological disruptions. Extreme fatigue, prolonged but disturbed sleep, voracious appetite, irritability and moderate to severe depression are the commonly reported withdrawal symptoms.

VOLATILE SOLVENTS

Drugs in this category are volatile hydrocarbons and petroleum derivatives like petrol, paints, nail polish remover, ether, glue, benzene, varnish thinner and lighter

fluid. This form of substance abuse is primarily found among street children who are less than 18 years old. Abuse of volatile solvents has been on the increase in the recent past.

Route of Administration

➡ Inhalation by sniffing.

Short-Term Effects

Behavioral effects include euphoria, clouded thinking, slurred speech and staggering gait. Hallucinations occur in about 50% of the abusers. The effects are about the same as for sedative-hypnotics and many youngsters who abuse these substances end up dependent on alcohol or other sedative type drugs.

Sudden death can occur due to sniffing these drugs.

Long-Term Effects

Long-term effects include psychosis and permanent brain damage. Tachycardia (increased heart beat) with possible ventricular fibrillation can occur. Damage to the liver, kidneys and heart is also possible.

OTHER DRUGS OF ABUSE

There are a few other drugs of abuse that do not belong to any of the above categories.

Abuse of the following drugs has been reported in India.

a) Muscle relaxants like carisoprodol (e.g. carisoma compound). The drug is available in the form of tablets

and is abused for its depressant-like effects.

b) CNS analgesics like dextropropoxyphene (e.g. proxyvon) and dextropropoxyphene in combination with dicyclomine (e.g. spasmoproxyvon). Tablets and ampoules are available. The drug is taken orally or intravenously. The pain relieving effects are very pronounced. These drugs are usually prescribed to relieve pain following accident trauma or surgery. When their use is not carefully monitored by the supervising physician addiction can develop.

c) Anti-histamines like chlorpheniramine maleate (e.g. avil).

d) Anti-emetics like promethazine (e.g. phenargan).

(Both these categories (c & d) of drugs are usually abused in combination with narcotic drugs like heroin or buprenorphine to enhance the effects.)

e) Anti-depressant drugs like amineptine (e.g. survector) that are used to elevate mood state and treat depression are sometimes abused for their sedation effects.

Prescriptions for these drugs need to be issued very carefully. The dosage needs to be reduced and withdrawn as and when the patient recovers. It is necessary to watch out for signs of tolerance. In case of tolerance, most physicians prefer to shift the patient to other categories of medication that do not produce the sought after effects. ■