

Substance Abuse

Introduction and CNC represents

Abdelkader Battah, MD, PhD

Professor of Toxicology

School of Medicine

The University of Jordan

Substance Abuse

The term is defined as the use of a substance for its pharmacological effects without medical indication or cultural acceptance.

Problems of Substance Abuse

Repeated substance abuse is associated with:

Substance:

- under the influence of its actions, toxicity
- Physical or Psychological Dependence,
- Tolerance
- Withdrawal

Problems of method of abuse:

Method of abuse:

- Injections: infections, aids hepatitis...
- Sniffing: Suffocation
- Snorting: Mucus membrane irritation, nasal septal perforation
- Smoking: Pulmonary problems, cancer

Substance additives effects: (adulterants, byproducts...) Allergy, modification of effects (additive, synergistic...)

Social and Financial: Loss of money, crimes...

Psychoactive drugs with possibility of abuse are controlled by laws: import, manufacturing, cultivation, prescription and dispensing, use are will explained under the laws and their regulations

- Controlled substances were divided into 8 classes
- 1+2+4 Narcotics (CNS depressants)
- 3 Prescription drugs that contain narcotics
- 5+6+7+8 Narcotics and other psychoactive drugs

Categories for Substances of Abuse

Depressants

Stimulants

Hallucinogens

Volatile substances

What are CNS Depressants?

Narcotics:

Opiates: Natural, synthetic and semi-synthetics

Depressants:

Benzodiazepines, Barbiturates, alcohol, anticonvulsants...

Narcotics

(Examples: Opiates: morphine, codeine, pethidine ,
buprenorphine , heroin...)

Drugs used medicinally to relieve pain

High potential for abuse

Cause relaxation with immediate "rush" Initial
unpleasant effects, nausea restlessness

Physical dependence

Possible Effects:

- Act on opioid receptors
- Euphoria, drowsiness, respiratory depression
- Constricted (pin-point) pupils
- ADH, Constipation

Method of abuse

- Usually they are taken by injection (heroin, morphine) leads to Scars (tracks) caused by injections
- Smoking (heroin)
- Oral (methadone)

Management

- Supportive management
- Antidote: Complete antagonist (naloxone)
- Treat withdrawal
benzodiazepines or methadone

CNS Depressants

CNS depressants

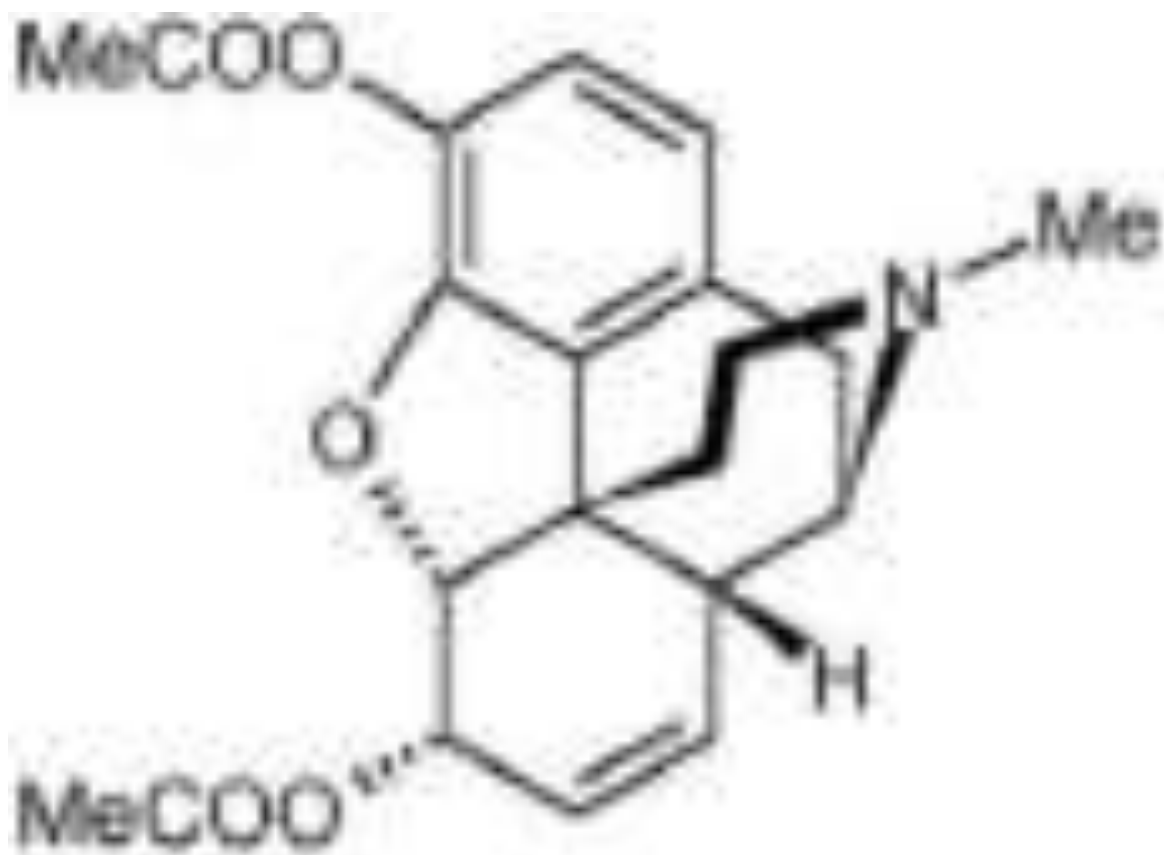
- Opioids
- Benzodiazepines
- Barbiturates

Definitions

- **Opioid** — The term opioid refers to natural and synthetic substances that act at one of the opioid receptor systems (*mu, kappa, delta*).
- Opioids can have analgesic and CNS depressant effects as well as the potential to cause euphoria.
- **Opiate** — Opiate refers to a subclass of opioids consisting of *alkaloid* compounds extracted from opium, including morphine, codeine, and semisynthetic derivatives of the plant *Papaver Somniferum*.

- **Heroin** — Heroin is a derivative of morphine and is the opioid most commonly abused.
- Its chemical name is **diacetylmorphine**
- **Opium** — Opium, extracted from the poppy plant
- **Endorphins** — Refer to a subclass of opioids consisting of endogenous peptides (produced by the human body) that cause pain relief, including enkephalins, dynorphins, and beta-endorphins.





Types of Opioids

- 1. Naturally occurring opioids:** morphine, narcotine, codeine, thebaine, papaverine and narceine. Endogenous neural polypeptides such as endorphins and enkephalins are also natural opioids
- 2. Semi-synthetic opioids** uses compounds isolated from natural sources (eg, plants) as starting materials. Eg: heroin, oxycodone, oxymorphone, and hydrocodone.
- 3. Synthetic opioids:** made using total synthesis, in which large molecules are synthesized from a stepwise combination of small and cheap building blocks, include buprenorphine, methadone, fentanyl, alfentanil, levorphanol, meperidine.
- 4. Opioid Receptor Antagonists:** Naloxone, Naltrexone, Hydrocodone

Mechanism of Action

- Opioid receptors have been identified: *mu*, *kappa*, *delta*
- Receptors are bound to G- proteins
- Receptors Regulate functions such as : Pain, Stress, Temperature, Respiration, Endocrine activity, Gastrointestinal activity, Mood, Motivation.

Heroin

- Heroin has a half-life of 30 min. but a duration of action of four to five hrs due to active metabolites, including **morphine** . Heroin is metabolized to 6-monoacetylmorphine (6-MAM) , a metabolite specific to heroin, detectable on urine testing.
- Also act on several CNS neurotransmitter systems including dopamine, gamma-amino-butyric acid (GABA), and glutamate.
- Heroin is more lipid soluble than other opioids, allowing it to rapidly cross the blood-brain barrier (within 15 to 20 seconds) and to reach high brain level

Clinical Presentation

- Patients who are acutely intoxicated can have **slurred speech**, **appear sedated**, and have **pinpoint pupils**. If they have injected opioids, then fresh **injection sites** may be visible on the physical examination.
- depressed respiration, alteration in temperature regulation, hypovolemia & increased sphincter tone.

- Withdrawal Symptoms : Physiologic effects include autonomic signs (tachycardia, high blood pressure, fever, piloerection, mydriasis, and lacrimation, irritability).
- Heroin withdrawal starts within 6-12 hours after the last dose, and peaks within 1-3 days and gradually subsides over 5-7 days.

Physical Exam

- Chronic intravenous use can be confirmed by the presence of marks, which are callouses that follow the course of a subcutaneous vein.
- Subacute bacterial endocarditis.
- Lymphadenopathy may suggest early viral infection, especially with HIV.
- Hepatic enlargement may indicate acute hepatitis

Investigations

- Look for the substance or its metabolites.
- Heroin: 6-monoacetyl-morphine (6MAM)
- Morphine: Heroin, morphine, codeine

Management

1. Opioid agonist treatment —
Methadone, buprenorphine (or, in selected countries, heroin administered in a controlled setting)
2. Opioid antagonist treatment **Naloxone**
3. Psychosocial support

Opioid Intoxication

General supportive measures for opioid intoxication are as follows:

- Assess patient to clear airway.
- Provide support ventilation, if needed.
- Assess and support cardiac function.
- Provide IV fluids.
- Monitor the vital signs and cardiopulmonary status until the patient has cleared opioids from the system.
- Naloxone is a specific opiate antagonist with no agonist or euphoriant properties. It rapidly reverses the respiratory depression and sedation caused by heroin intoxication

Maintenance

- **Methadone:** long-acting opioid agonist, binds to and occupies *mu*-opioid receptors, preventing withdrawal symptoms for 24 hours or longer, reduces craving for opioids, and, reduces the euphoric effects of subsequent illicit opioid use.
- **Buprenorphine:** partial *mu*-opioid agonist, reduces illicit opioid use when used in the long-term treatment of patients. Buprenorphine for opioid use disorder treatment with or without naloxone.

Withdrawal Syndrome:

- High possibility of Dependence
- Watery eyes, runny nose, yawning, cramps
- Loss of appetite, irritability, nausea
- Tremors, panic reaction, chills, sweating
- Convulsion, death