MED441
KING SAUD UNIVERSITY

BH
Bassam Alhubaysh
REVIEWED BY

Substance Abuse Disorders

By Dr. Majid Al-Desouki "The slides are enough for the exam"

Objectives:

- To understand basic etiology and pathophysiology of substance use disorders.
- To know the most common substances of abuse, their effects, and serious outcomes.
- To be able to conduct a general assessment for those suffering with substance use disorders.
- To be able to differentiate between different clinical presentations including concurrent disorders.
- To gain a basic understanding of the prognosis and management of substance abuse disorders.

Color index:

- Important
- Golden
- Textbook
- Old notes (439/438)
- New notes (441)
- Extra

Substance Use Disorders

◄ Introduction

- Many implications for brain research & clinical Psychiatry.
- Affect mental state and behavior.
- Symptoms similar to the psychiatric disorders. *"May make their diagnosis harder, especially psychosis"*

◄ What is Addiction?

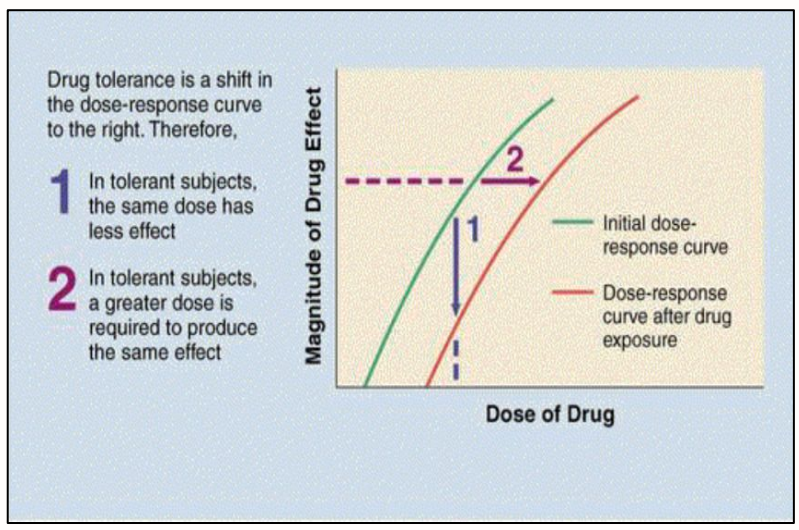
- In Aug 2011, The American Society of Addiction Medicine (ASAM) has officially recognized Addiction as mostly **a primary chronic brain problem.**
- **Genetic predisposition** plays an important role in addiction. If two persons were using the same substance in the same amounts the effect may differ depending on their genetic predisposition.
  (e.g., dopamine receptor mutations or **aldehyde dehydrogenase polymorphisms in asians**)
- Addiction is not a choice, but choice still plays an important role in getting help.

◄ Definitions

- **Abuse**: Self-administration of any substance in a **culturally disapproved** manner that causes **adverse consequences**.
- **Intoxication: The transient effect** (physical and psychological) due to recent substance ingestion, which **disappears when the substance is eliminated**.
- **Withdrawal:** a group of **symptoms and signs occurring when the drug is withdrawn** or reduced in amount.
- **Dependence: The physiological state of neuroadaptation** produced by **repeated administration of a drug, necessitating continued administration to prevent appearance of withdrawal state.**
- **Addiction: A nonscientific term** that implies **dependence and associated deterioration of physical mental health** as well as **high tendency to relapse after discontinuation**.

◄ Drug Tolerance

- The higher the dose the higher the effect of the drug.
- Initially, the individual will achieve the desired effect with lower dose (the green curve) but as he/she continue to ingest the drug, he/she will need higher dose to reach the same effect (the orange curve) "tolerance".
- **Tolerance and withdrawal symptoms** are essential to diagnose someone with **dependence.**



Substance Use Disorders

◄ Basic Classifications

There are 2 main classes:

1. **CNS Suppressants:** Alcohol – Sedatives – Inhalants – Opioids.
2. **CNS Stimulants:** Amphetamine – Cocaine.
3. Cannabis *"considered as another class as it has many different effects"*

◄ Assessment

- ABCDE
- **Collateral history**, & Examination. *"substance users minimize the extent of their problem unconsciously, so it's important to have a collateral history from a close person"*
- Urine screening tests.
- Blood screening tests (alcohol, barbiturates).
- **Pattern of Abuse:**
  - **What?** (type, dose, route, effect: nature and duration).
  - **How?** (frequency, duration, how long, source, and situation).
  - **Why?** (Psychosocial problem).
  - **Dependence?** *"Abuse vs Dependance"*
- Complications:
  - Psychosocial.
  - Physical.

Alcohol & Related Mental Disorders

◄ WHO Report (Feb 2011)

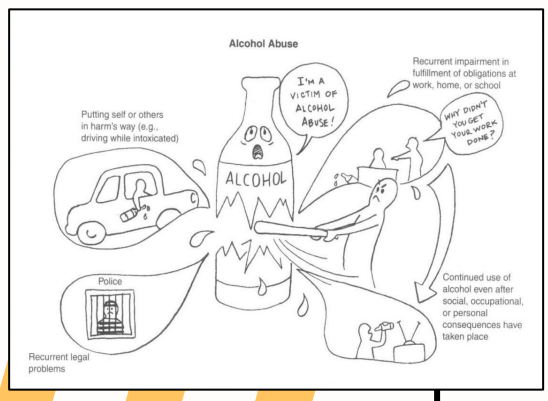
- Alcohol causes nearly 4% of deaths worldwide, more than AIDS, tuberculosis or violence.
- Alcohol is the world's leading risk factor for death among **males aged 15-59**.
- Alcohol is a causal factor in 60 types of diseases and injuries.

◄ Risk Factors of Alcohol Abuse

- Vulnerable personality: impulsive, gregarious, less conforming, isolated or avoidant persons.
- Vulnerable occupation: senior businessmen, journalists, doctors.
- Psychosocial stresses: social isolation, financial, occupational or academic difficulties, and marital conflicts.
- Emotional problems: anxiety, chronic insomnia, depression.

◄ Alcohol Abuse

- Excessive consumption: harmful use.
- Problem drinking: drinking that has caused disability, but not dependence.
- Alcohol dependence: This usually denotes alcoholism.
- Alcohol-related disability: physical, mental and social.



Alcohol & Related Mental Disorders

◄ How Much is Too Much?

- There are 3 main classes of alcohol: Hard liquor, Wine and Beer.
- Hard liquor includes: Vodka, tequila and whisky.
- Alcohol concentration differs between them. Hard liquor has the most, followed by wine, then beer which contains the least amount of alcohol.
- So if a person drinks 3 small tequila shots, they are drinking the equivalent amount of alcohol found in 3 large beer bottles.

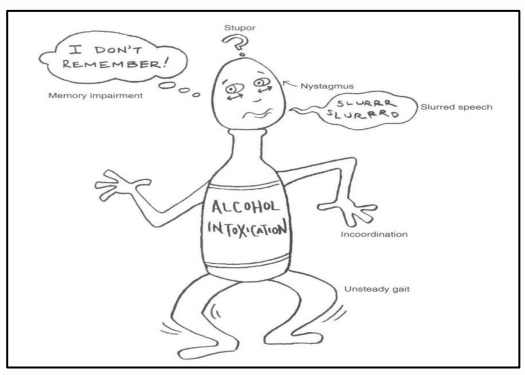
◄ Clinical Presentation

- **Arak = عرق = CNS depressant**
- **Alcohol Intoxication:**
  - Sense of well-being, emotional lability, irritability and incoordination→ with higher intake patient develop ataxia and slurred speech (cerebellar involvement).
  - Heavy Intoxication (bl >300 mg/ml)→ **alcoholic coma & death.**
  - **Acute Intoxication may mimic:**
    - **Panic attacks.**
    - **Depression.**
    - **Acute psychosis** with delusions +/- hallucinations.

Alcohol Intoxication Ethanol Plasma Concentration Vs CNS Effects	
Plasma Concentration (mg/dl)	Impairment
-	Feeling of relaxation, euphoria
20-30	Slowed thinking
30-80	Motor incoordination
80-200	Cognition, judgement, lability
200-300	Slurring, ataxia, nystagmus, blackouts
>300	Vital signs, coma, possible death due to the respiratory failure
If the impairments do not develop at the above plasma concentrations then this may indicate tolerance or less often, a hypersensitivity	

◄ Alcohol withdrawal

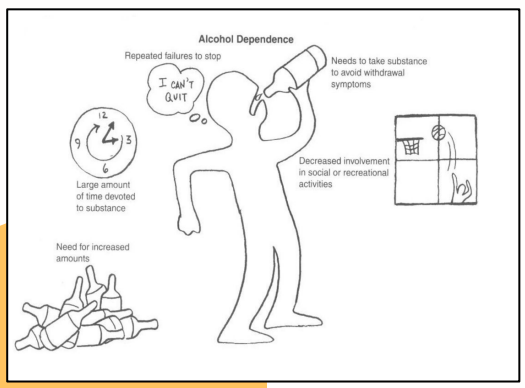
- **Symptoms include: Memory impairment, incoordination, slurred speech**, unsteady gait, nystagmus and stupor.
- Sx may **begin after 6 hours** of cessation **peak by 48 hours**.
- **Sx subside over the course of 5-7 days**.
- **Epileptic generalized tonic clonic Seizures** may develop **within 12-24 hours** after cessation of alcohol intake. *"when stopping sedative→ may lead to ↑activation of nervous system→ causes seizures."*
- **Delirium tremens** may develop **after about 48 hours**. *"it causes a strong Tremor that's why it's called delirium Tremens"*



◄ Alcohol Dependance

"Tolerance + Withdrawal"

- 15-20 years before evident. As they don't start drinking in high amounts so it takes time before dependence develops.
- Dependence is most common in those aged 40 – 55 years.
- Alcoholics who continue drinking have a shortened life-span of 15 years why? Mainly due to complications (Medical, Fights, Overdose, Suicide, DUI).



Complications Of Chronic Alcohol Abuse

Medical	Psychological	Social
• Neurological. • Cerebral degeneration. • **Seizures**. • Peripheral neuropathy. • Optic nerve atrophy. • Alimentary Tumors (esophagus, liver). • Gastritis, peptic ulcer. • **Pancreatitis**. • Hepatitis, **liver cirrhosis**. • Cardiomyopathy. • Anemia. • Gynaecomastia.	• Amnestic disorder. • **Delirium Tremens**. • Dementia. • **Psychosis**. • Depression. • Reduced sexual desire. • Insomnia • Personality deterioration. • Increased risk of suicide. • **Morbid jealousy**. *"preoccupation with a partner's sexual unfaithfulness (delusions)"*	• Social isolation. • Job loss. • Marital conflicts. • Family problems. • Legal troubles. • Social stigma.

◀ Screening - CAGE Questionnaire

- Have you ever:
  1. Wanted to **Cut down** on your drinking?
  2. Felt **Annoyed** by criticism of your drinking?
  3. Felt **Guilty** about drinking?
  4. Take a drink as an "**Eye-opener**" ("أول ما يصحى"على الريق) to prevent the shakes *"tremor from withdrawal"*?

➔ If the patient answered **YES** to **TWO** or more questions then he is a **Heavy drinker.**

◀ Laboratory Tests

- Identify acute and/or heavy drinking **(≥5 drinks/day)**:
  - Blood Alcohol Levels (BAL).
  - Gamma-glutamyltransferase (**GGT** > 35 IU/L).
  - Erythrocyte **mean corpuscular volume** (MCV >91.5 µ3). *"Megaloblastic anemia picture (in chronic use)" / Hypochromic macrocytic anemia*
  - High AST/ALT.

◀ Treatment

➔ **Treating Alcohol Intoxicated Patient:**
- Conscious: supportive, antipsychotic if agitated.
- Unconscious: ABCs.

➔ **Treating Alcohol Withdrawal:**
- Supportive.
- **Thiamine (B1).** *"to prevent wernicke and korsakoff syndromes caused by vitamin B1 deficiency"*
- **Long acting BDZ** ± anticonvulsants for seizure.

➔ **Maintaining Abstinence:**
- **Disulfiram**: blockade of aldehyde dehydrogenase→ accumulation of acetaldehyde→ nausea, flushing, tachycardia, hyperventilation, panic...
- **Naloxone**: reduces alcohol-induced reward.
- **Acamprosate**: **Anti-craving effects**.

➔ **Psychological:** *"Long term treatment"*
- Individual, group Rx, relapse prevention.

Delirium Tremens (DTs)

◄ Introduction

- **Severe form of alcohol withdrawal after 2-3 days:**
  - **Gradual onset of delirium and gross tremors.**
  - If a patient presents to the ER due to an accident and on assessment you find out that he drinks alcohol then he should not be discharged within the next 48 hours to make sure that DTs and Seizure are prevented.
  - **A classical scenario in MCQs: A patient found delirious several days after hospitalization due to cessation of alcohol intake.**
- Other features:
  - Autonomic disturbance.
  - Dehydration and electrolyte disturbance.
  - Insomnia.
- **Peaks on 3rd or 4th day**.
- Lasts 3-5 days.
- Worse at night and followed by a period of prolonged deep sleep after which the patient has amnesia.

◄ Complications

- Violent behavior.
- Seizures (chest infection & aspiration).
- Coma.
- Death (mortality rate: 5-15%).

◄ Causes

- Volume depletion.
- Cardiac arrhythmias.
- Electrolyte imbalance.
- Infections.

◄ Treatment

DT is a serious MEDICAL emergency! detection and treatment – **ICU** or medical ward.

- **Avoid antipsychotics** In delirium caused by medical conditions we usually give antipsychotics, but avoid them in alcohol induced delirium because they increase the risk of **seizures** by decreasing the threshold.
- **Guard against seizures**.
- **Rehydration**.
- **Thiamine (B1)**.
- **Adjust surroundings**.

Sedatives, Hypnotics & Anxiolytics

◄ Introduction

- Similar clinical manifestations and withdrawal to alcohol. *"they also have a synergistic effect"*
- Ex: **Barbiturates** (not used anymore because of low therapeutic index), **Benzodiazepine** (diazepam, lorazepam clonazepam "ROCHE-2 روش٢", alprazolam "xanax" highly abused).
- Risk of cross-tolerance and cross-dependence. If someone is dependent on alcohol then he will be dependent on sedatives, hypnotics and anxiolytics (cross dependence), and also if the person needs increasing amounts of alcohol to prevent withdrawal symptoms then he will also need higher amounts of sedatives, hypnotics and anxiolytics (cross tolerance).
- Withdrawal depends on substance.
- BDZ have a large margin of safety & less addiction potentials. *"compared to Barbiturates"*
- **Flumazenil** is a BDZ receptor antagonists used in BDZ overdose. *"Used in the ER"*

Opioids

◄ Introduction

- Naturally occurring (e.g. opium, codeine), synthetic or semi-synthetic.
- Medical use (e.g. Pethidine) give powerful analgesic effect.
- Substance of abuse (e.g. Heroin).
- Abused for **euphoriant effect**.
- Examples: **Opium, heroin, morphine, codeine, pethidine, methadone**.

Different kinds and amounts of opioids with different potencies

Opioid Intoxication

Presentation	Treatment

• **Euphoria**.
• **Relaxation**.
• **Analgesia**.
• Disturbed consciousness.
• Small pupil **(initially).** *"Pinpoint/Constricted pupil"*
• Bradycardia.
• Reduced appetite.
• **Constipation**.
• Respiratory depression.
	• **ICU:**
	  ○ Monitoring.
	  ○ **Naloxone**. *"Antidote"*
	  ○ **Open airway – oxygen – IV fluids.**

Opioid Withdrawal

Presentation *"intoxication عكس ال"*	Treatment

1. Lacrimation, rhinorrhea & yawning.
2. Dysphoric mood.
3. **Insomnia**.
4. **Muscle and joint aches**.
5. Cold and hot flashes.
6. **Nausea, vomiting and diarrhea**.
7. Fever, **sweating, piloerection**.
	• Short-term: *"Supportive"*
	  ○ **Painkillers**, **sedatives**, observation.
	  ○ Clonidine
	• Long-term:
	  ○ **Harm reduction strategies**.
	  ○ **Methadone**.
	  ○ Buprenorphine/Naloxone.

- Intense craving begins 6 hours after the last dose and peaks after 36-48 hours.
- Untreated withdrawal result in no serious medical sequelae - but they cause great distress.
- **Tolerance can develop very rapidly** (esp. in IV use) leading to increasing dosage - then it diminishes very rapidly.
  *"If someone gets treated for the addiction and after a while suddenly relapses and takes the same last dose it will lead to an **overdose**."*

➔ **Opioid intoxication is more serious than alcohol intoxication because of high risk of Respiratory depression and death.**

➔ **Alcohol withdrawal is more dangerous than opioid withdrawal because of Seizures and DTs.**

◄ Complications of Injecting

- **Bacterial, local and systemic**.
- **Blood-borne viruses**. *"ex: HIV, Hepatitis B&C"*
- **Vascular damage**.
- In this case:
  - Track marks.
  - Early cellulitis.
  - Multiple injections over a short period suggests cocaine use. *"due to short half-life"*

Inhalants

◄ A Case Scenario

- Adeeb is a **16 year old** boy who lives with his divorced mother. He presented with slurred speech, **facial rashes**, incoordination and nausea.

◄ Introduction

- Volatile organic substances –acetone, benzene,"مزيل حبر", etc.
- Brain depressants.
- Most commonly used by **Adolescents** – experimentations. *"cheapest and most accessible"*
- Intoxication – similar to other brain suppressants.
- Complications:
  - Physical: **Multiple organ damages**

Psychostimulants

◄ A Case Scenario

- Rakan is a 20-year old male brought to the ER by police who arrested him because of **reckless** driving (drifting with high speed) and violent behavior. He looked **over-suspicious, agitated, and over-talkative.**

◄ Commonly Used Stimulants

- **Nicotine**.
- **Caffeine**.
- **Cocaine** – Freebase/crack.
- **Amphetamine/Methamphetamine.**
- Methylenedioxymethamphetamine (**MDMA**) "ecstasy" used in dance clubs.
- Appetite suppressants (e.g. phentermine and diethylpropion).

◄ Psychological Factors of Non-Dependent Use

- **Recurrent intoxication**. *"due to short half life"*
- Some users may self-medicate with antidepressants and/or benzodiazepines *"to decrease the effect of the drug"*
- **After-Effects: termed 'crash' or 'come down'**
  - Dysphoria.
  - Depressed mood.
  - Anxiety.
  - Reduced appetite.
  - Restlessness.

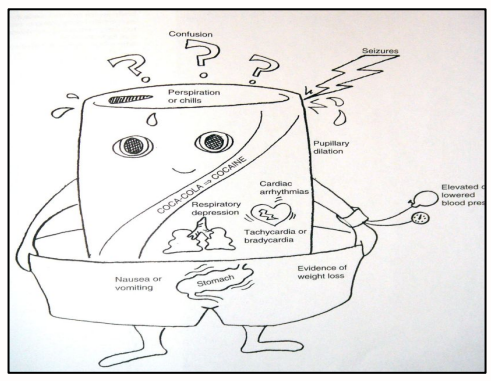
Clinical Effect of Stimulants

Psychological	Physical

• **Enhanced cognitive function.**
• **Elevated mood.**
• **Over activity/Hyperactivity.**
• Increased confidence, self-esteem and sociability.
• **Over Talkativeness.**
• **Insomnia.**
• **In high doses/prolonged use:**
  ○ Restlessness, irritability.
  ○ **Paranoid** psychosis.
  ○ Hallucinations (visual).
  ○ **Aggressiveness**, hostility.
	• **Reduced sense of fatigue.**
	• **Reduced appetite (anorexia).** *"abused by models"*
	• Dilated pupils.
	• Tremors.
	• **In high doses/prolonged use:**
	  ○ Nausea, vomiting, hyperthermia, cardiac arrhythmias, severe hypertension, CVA, seizures, Dizziness, respiratory distress.

◄ Cocaine

- Works on **Dopamine.**
- Forms of cocaine:
  - Free base. *"smoking"*
  - Crack.
- Routes of use:
  - Intranasal *"more expensive → high socioeconomic status"*
  - Intravenous/SC *"low socioeconomic status"*
- **Signs of intoxication include:** Seizures, Cardiac arrhythmias, Pupillary dilation, Evidence of weight loss and irregular vital signs.

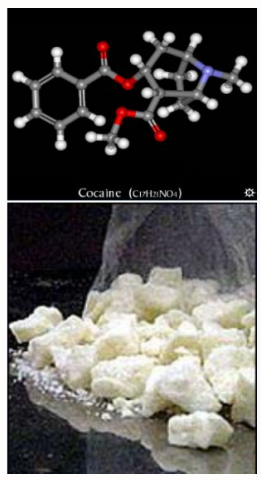


◄ Treatment of Psychostimulants

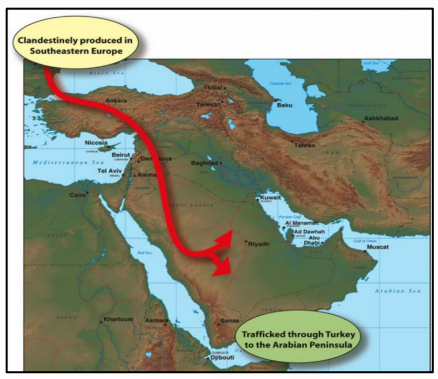
- Symptomatic use of antipsychotic.
- Antidepressant sometimes useful.
- Psychotherapy (individual, family & group).

Weak Stimulant قات

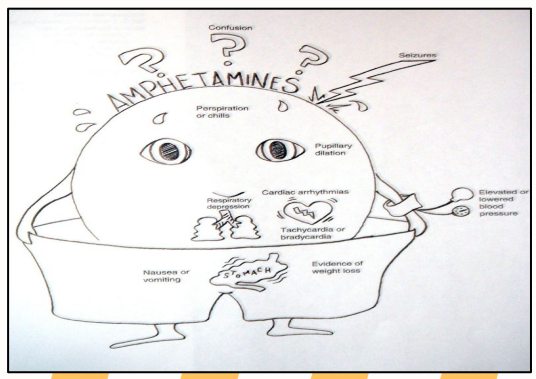
Crystal Meth



Crack cocaine



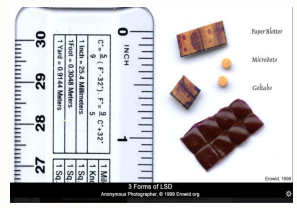
Captagon (Fenethylline)



Hallucinogens

◄ Introduction

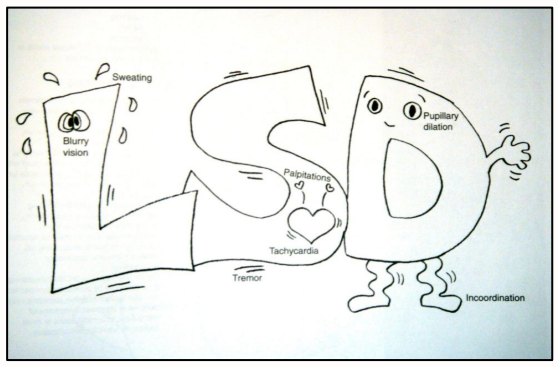
- These are group of substances that **induce hallucination** and produce loss of contact with reality.
- Natural and synthetic substances that are also called psychedelics or psychotomimetics.
- Natural e.g. psilocybin (magic mushroom) or synthetic like lysergic acid diethylamide (**LSD**).
- **No medical use and high abuse potential.**
- The only substance that **doesn't cause dependence**.



Clinical Effect of Hallucinogen	
Psychological	**Physical**
• Marked perceptual distortion (changing shapes and colors). • **Hallucination (visual and tactile).** • False sense of achievement and strength. • Euphoria or anxiety and panic. • Paranoid ideation. • **Homicide and suicide tendencies.** • **Flashbacks.** • Delirium.	• Tachycardia. • Hypertension. • Cerebellar signs. • Wide pupils. • Hyperemic conjunctiva. • Blurred vision. • Hyperthermia.

◄ Effects of LSD

- Effects of drug come on in about 30 min.
- First signs are autonomic activation.
- Followed by overt behavioral signs - loosening of emotional inhibitions.
  - Giddiness; laughter for no reason.
  - Mood euphoric and expansive, but labile mood swings notable.
- Abnormal color sensations, luminescence.
- Colors reported as more brilliant.
- **See the sounds and hear the colors "synesthesia".**
- Space and time disorders.
- Added depth with loss of perspective - up/down Altered.
- Close in space influenced more than distant.
- General **slowing of time** reported.



◄ Tolerance/Dependence

- Not significant producers of tolerance or dependence "no addiction".
- No withdrawal either.
- Problems related to the things people do while under the influence:
  - Accidents, Suicide, Aggression/violence, Toxic reactions.

New Psychoactive Substances (NPS) & Cannabis

◄ New Psychoactive Substances (NPS)

- Variable quantity and potency (up to 10,000 x morphine).
- **Synthetic materials with high potency.**
- Synthetic Cathinones same substance in قات.
- Synthetic Cannabis.
- Synthetic Benzodiazepines.

Cannabis

1438			
~115,000	Amphetamine + Cannabis	Cannabis	Amphetamines
Riyadh	34	74	455
Jeddah	325	288	460
Eastern province	367	214	288
Northern borders	16	135	108
Others	1015	942	1561
Total	1757	1653	2872

Number of patient admitted to the hospital due to cannabis, amphetamine or amphe+cannabis. According to MOH - AlAmal Complexes

◄ A Case Scenario

- Bandar is a 32-year old male brought to outpatient clinic by his wife because of recurrent periods of being **over-suspicious, euphoric, and talkative**. He admitted abusing cannabis in the weekends.

◄ Introduction

- **Cannabis - Marijuana**, **Hashish**, Hash oil, Hemp.
- Delta-9-tetrahydrocannabinol.
- Many other components.

Cannabis Plant

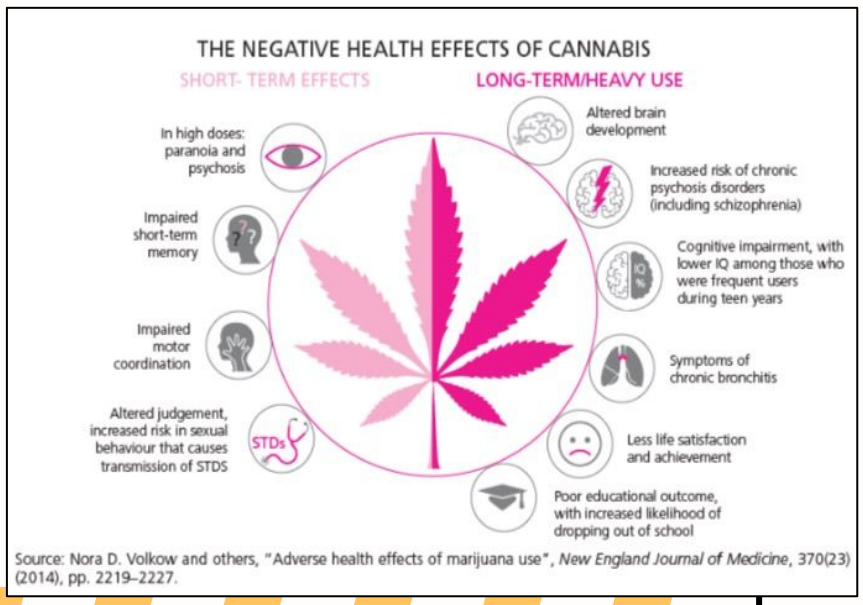
Marijuana

Hashish

10 times more potent than marijuana

◄ Effects of Cannabis

- Some of the effects of Cannabis use include:
  - Short-term effects: **Euphoria**, **Psychosis and paranoia**, **Impaired memory** (short-term), **Red Eyes**, Impaired motor coordination and Altered judgement.
  - Long term/Heavy use: **Increased risk of chronic psychosis disorders** (including schizophrenia), Cognitive impairment (with lower IQ), Symptoms of chronic bronchitis "like or more than smoking".



Source: Nora D. Volkow and others, "Adverse health effects of marijuana use", *New England Journal of Medicine*, 370(23) (2014), pp. 2219–2227.

◀ Marijuana Intoxication

- Subjective quickening of associations and **euphoria**.
- Relaxation, decreased motor activity, sense of calm.
- Intense influx of sensory information.
- Diminished sensory gating, users avoid strong stimuli, synesthesia (Iverson 2008).
- Followed by a coming-down phase - **cravings to sweet and salty foods** - social withdrawn (Iverson 2008).
- Any substance that increases the levels of dopamine in the brain will lead to dependence (**dopamine is the pleasure neurotransmitter in the brain**).

◀ Outcomes

- About 10% of all users will become dependent.
- About 40% of heavy users will become dependent.
- On average - using for 10 years and tried to quit 6 times.
- Great comorbidity - especially with adolescents.
- With increased comorbidity - worse prognosis.
- Hashish is 5-10 times more potent than marijuana.

◀ Screening "Four Cs" Test (Not Important)

1. **Compulsion**: intensity over thoughts, feelings and judgement.
2. **Control**: controlling chemical use after starting.
3. **Cutting down**: effects of reducing.
4. **Consequences**: denial or acceptance of damage.

◀ Treatment of Cannabis

- Same principles of abuse- abstinence and support.
- **Education is cornerstone** for both abstinence & support.
- Support through individual, family, and group psychotherapies.
- Antipsychotic medication.
- Anti-anxiety/antidepressant drug may be useful.

Doctors Questions (From the Slides):

1- A 41-year-old businessman came to the emergency department complaining of insomnia for 3 days after he ran short of his sleeping pills. He was asking for a specific drug manufactured by ROCHE Company. He knows that each tablet is 2 mg. He said he uses 5 tablets each night to sleep. The most likely problem of this patient is:

A- Heroin abuse.
B- Benzodiazepines abuse.
C- Methadone abuse.
D- Abuse of painkillers.

2- A 33-year-old single man was caught by police officers and put in prison because he was driving his car recklessly with high speed at 3am in the highway. Next day he started to show excessive lacrimation, runny nose, repeated vomiting, and abdominal cramps. However, his consciousness was intact. The most likely problem of this patient is:

A- Cannabis abuse.
B- Methadone intoxication.
C- Abuse of naloxone.
D- Opioid withdrawal.

3- A 32-year-old man became increasingly irritable, insomniac, hypervigilant for the past 4 weeks with unpredictable mood and accusing his wife with extramarital sexual relationships. The most likely diagnosis is:

A- Heroin abuse.
B- Generalized anxiety disorder.
C- Amphetamine abuse.
D- Paranoid Schizophrenia.

4- A 43-year-old man has episodic behavioral disturbances including; euphoria, talkativeness, and disinhibition. His eyes look red most of the time. The most likely diagnosis is:

A-Alcohol abuse.
B- Cannabis abuse.
C- Amphetamine abuse.
D- Cocaine abuse.

5- A 16-year-old boy presented with slurred speech, incoordination and nausea. Physical examination revealed facial rashes around his mouth and nose. When asked about substance abuse his reply was affirmative. The most likely substance is:

A- Cannabis.
B- Alcohol.
C- Volatile substance.
D- Morphine.

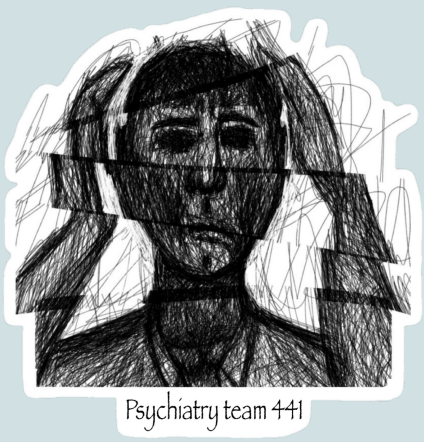
Answers: 1-B, 2-D, 3-C, 4-B, 5-C

Team leader

- **Saleh Aloraini**

Team members

- Abdulrahman Aljofan
- **Faisal Alhussaini**
- Alwaleed Bin shaya
- Faisal Bin moammar
- Mishari Alzoubi
- Abdulmajeed Namshah
- Abdulrahman bawazir
- Abdulmalik Alduraibi
- Hamad Alothman
- Sultan Alkassim
- Faisal Alshuaibi
- Abdullah Alyamani
- Talal Alanazy
- Yahya Alghamdi
- Osama Alsaaid



Good luck!!

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Special thanks to 439 & 438 psychiatry teams