NAADAC: Learning Objectives

What do you expect from this session?
Setting the Stage: Terminology

DSM 5: Substance Related and other Addictive Disorders

Substance Related Disorders
- Substance Use Disorders
- Substance Intoxication
- Substance Withdrawal
- Substance Induced
- Other Substance Related Disorders
What’s a Drug??

Definitions Key Terminology
• Classifications of Substances:
  According to Effect:
  – CNS Depressants
  – CNS Stimulants
  – Hallucinogens
  According to Origin:
  Natural
  Synthetic
Definitions Key Terminology

• Classifications of Substances:
  According to Legal Status
  Illicit
  Legal
  Prescription
  Over the counter

Definitions: Key Terms

• Substance Use Disorder per DSM-5
• Continuum of Use & Abuse
• Addiction – Dependence
• Use Disorder – Abuse
• Gateway Drugs

• Abstinence
• Harm Reduction
Table 1. Factors That Must Be Considered by the DEA Before a Drug Can Be Scheduled

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Classification Criterion</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-I</td>
<td>Substances have a high potential for abuse, have no currently accepted medical use in treatment in the U.S. and have a lack or absence of a currently accepted medical use (with severe restrictions)</td>
<td>Ecstasy (MDMA), heroin, LSD, marijuana, methaqualone, peyote</td>
</tr>
<tr>
<td>C-II</td>
<td>Substances have a high potential for abuse, which may lead to severe psychological or physical dependence, and have a currently accepted medical use (with severe restrictions)</td>
<td>Hydromorphone, methadone, meperidine, oxycodone, fentanyl, morphine, opium, codeine, cocaine, ampheta mine, methamphetamine, methylphenidate</td>
</tr>
<tr>
<td>C-III</td>
<td>Have less potential for abuse than substances in C-I or C-II, and abuse may lead to moderate or low physical dependence or high psychological dependence</td>
<td>Hydrocodone/acetaminophen (Vicodin), Tylenol with Codeine, buprenorphine, buprenorphine, phenindione, ketamine, anabolic steroids (Deo-Testosterone)</td>
</tr>
<tr>
<td>C-IV</td>
<td>Have a low potential for abuse relative to substances in C-III</td>
<td>Alfentanil, carfentanil, clonazepam, clorazepate, diazepam, lorazepam, midazolam, temazepam, triazolam</td>
</tr>
<tr>
<td>C-V</td>
<td>Have a low potential for abuse relative to substances listed in C-IV and consist primarily of preparations containing limited quantities of certain narcotics</td>
<td>Robitussin AC, Phenegran with Codeine, ecogabine</td>
</tr>
</tbody>
</table>

LSD: lysergic acid diethylamide; MDMA: 3,4-methylenedioxyamphetamine. Source: Reference 6, 5.
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

C-III: Have less potential for abuse than substances in C-I or C-II, and abuse may lead to moderate or low physical dependence or high psychological dependence
- Hydrocodone/acetaminophen (Vicodin, Tylenol with Codeine), buprenorphine, buprenorphine, methadone, ketamine, anabolic steroids (Drostanolone, Testosteron)

C-N: Have a low potential for abuse relative to substances in C-II
- Alprazolam, oxazepam, clonazepam, diazepam, lorazepam, midazolam, bromazepam, braxolam

C-V: Have a low potential for abuse relative to substances listed in C-N and consist primarily of preparations containing limited quantities of certain narcotics
- Methadone, A2, Phenetermine with Codeine, oxycodone

LDH: 3,4-Methylenedioxymethamphetamine. Source: Reference 6, 7.

Harm Caused by Drugs

- Alcohol
- Heroin
- Crack Cocaine
- Methamphetamine
- Cocaine
- Tobacco
- Amphetamine
- Cannabis
- GHB
- Benzodiazepenes
- Ketamine
- Methadone
- Mephedrone
- Butane
- Qasi/Khat
- Anabolic Steroids
- Ecstasy
- LSD
- Buprenorphine
- Mushrooms

Harm to others: Harm to users

*With a maximum possible harm rating of 100
Routes: Introducing Substances into the Body

- Injection – Intravenous – Intra-arterial
- Oral – Mucosal - Sublingual
- Nasal/oral – Sniffing and Inhalation
- Topical - Transdermal
- Subcutaneous
- Intrathecal - Intramuscular
- Rectal – Vaginal
• Tolerance

• Dependence:
  – Physiological
  – Psychological/Emotional

• Withdrawal:
  – Acute
  – Post-Acute Withdrawal (PAWS)
  – Protracted

Drug Testing

• Urinalysis – quickest
• Breathalyzer – alcohol specific
• Blood – most accurate, short
• Saliva
• Hair strand test
Ecstasy was first popularized by California psychotherapists who tried to use it for “empathy training” in marriage counseling. Heroin for common cold. Cocaine in Coca Cola.

---

**Substance-Related and Addictive Disorder Changes**

- Gambling disorder is added.
- No longer separates the diagnoses of “abuse” and “dependence”.
- Criteria are provided for a “substance use disorder” with severity judged on the number of criteria met. Also included are criteria for:
  - Intoxication, withdrawal, substance-induced disorders, and unspecified substance-related disorders.
Substance -Related and Addictive Disorder Changes

- The DSM IV “recurrent substance related legal problems” is switched out with “craving, or a strong desire or urge to use a substance”.

- A new criteria threshold is in place to establish a substance use disorder…it is now “two or more” criteria. Past abuse was one or more or three or more for dependence.

Substance -Related and Addictive Disorder Changes

- Cannabis withdrawal and caffeine withdrawal are new disorders.

- The DSM IV specifier for “physiological subtype” is eliminated.

- The DSM IV diagnosis of “polysubstance dependence” is eliminated.
Substance-Related and Addictive Disorder Changes

- “Early remission” is defined as “at least three months but less than twelve months” without meeting substance use disorder criteria (except for craving).
- “Sustained remission” is defined as at least “twelve months without meeting criteria” (except craving).
- Additional Specifiers:
  - “in a controlled environment,” “on maintenance therapy”

DSM V Criteria for Substance Use Disorders

A problematic pattern of use leading to clinically significant impairment or distress, as manifested by at least two of the following, occurring within a 12 month period:
**Impaired Control:**

1. Using larger amounts or for longer time than intended
2. Persistent desire or unsuccessful attempts to cut down or control use
3. Great deal of time obtaining, using, or recovering
4. Craving or strong desire or urge to use

**Adverse Effects (a)**

5. Fail to fulfill major roles (work, school, home)
6. Persistent social or interpersonal problems caused by substance use
    - **Preoccupation**
    7. Important social, occupational, recreational activities given up or reduced

**Adverse Effects (b)**

8. Use in physically hazardous situations
9. Use despite physical or psychological problems caused by use
Substance Use Disorders

**Pharmacological Criteria:**

9. Tolerance as defined by either of the following:
   - Need to use an increased amount of a substance in order to achieve the desired effect
   - Markedly diminished effect with continued use of the same amount of the substance

10. Withdrawal as manifested by either of the following:
   - The characteristic withdrawal syndrome of the substance
   - The substance is taken to relieve or avoid withdrawal symptoms

Severity and Specifiers

- Severity is ranges from mild to severe based on the number of symptoms
  - **Mild:** two to three symptoms
  - **Moderate:** four to five
  - **Severe:** six or more

- Course Specifiers:
  - “in early remission”
  - “in sustained remission”
  - “on maintenance therapy”
  - “in a controlled environment”
Substance Classes

- Alcohol
- Caffeine
- Cannabis
- Hallucinogens
  - PCP
  - others
- Inhalants
- Gambling
- Opioids
- Sedatives, hypnotics, and anxiolytics
- Stimulants
- Tobacco
- Other

Substance-Related Disorders

2 Groups:

Substance Use Disorders
- Previously split into abuse or dependence
- Involves: impaired control, social impairment, risky use, and pharmacological criteria

Substance-Induced Disorders
Substance-Induced Disorders

Intoxication
Withdrawal
Psychotic Disorder
Bipolar Disorder
Depressive Disorder

Anxiety Disorder
Sleep Disorder
Delirium
Neurocognitive
Sexual Dysfunction

Intoxication

Reversible substance-specific syndrome due to recent ingestion of a substance. Behavioral/psychological changes due to effects on CNS developing after ingestion: ex. Disturbances of perception, wakefulness, attention, thinking, judgement, psychomotor behavior and interpersonal behavior. Not due to another medical condition or mental disorder. Does not apply to tobacco.
Withdrawal

Substance-specific syndrome
problematic behavioral change due to
stopping or reducing prolonged use
Physiological & cognitive components
Significant distress in social,
occupational or other important areas
of functioning
Not due to another medical condition
or mental disorder
No withdrawal: PCP; other
hallucinogens; inhalants

Neuroadaptation:

Refers to underlying CNS
changes that occur
following repeated use such
that person develops
tolerance and/or withdrawal
Pharmacokinetic – adaptation
of metabolizing system
Pharmacodynamic – ability of
CNS to function despite high
blood levels
### Tolerance

Need to use an increased amount of a substance in order to achieve the desired effect

OR

Markedly diminished effect with continued use of the same amount of the substance

---

### Substance-Induced Mental Disorder

Potentially severe, usually temporary, but sometimes persisting CNS syndromes

Context of substances of abuse, medications, or toxins

Can be any of the 10 classes of substances
Substances by Effect Classification

- Major Depressants: opiates/opioids, sedative hypnotics (barbiturates, benzodiazepines, Z-hypnotics), and alcohol
- Minor Depressants: skeletal muscle relaxants (Soma, Flexeril), antihistamines (cold & allergy medications), over-the-counter depressants and look-alike depressants.
Depressants
1. Alcohol
2. Opioids
3. Sedatives
4. Cannabis

Last month, 129 million Americans consumed an alcoholic beverage – 16 million are heavy drinkers.

25 – 30% of all U.S. hospital admissions were due to alcohol.

Alcohol was the first psychoactive drug.

Alcohol is a CNS depressant, reward, food, medicine, sacrament, water substitute, social lubricant, source of taxes, and emotional tranquilizer.
DEPRESSANTS: EFFECTS

 ✓ Depressants include medications and street drugs. Depressants inhibit the function of the central nervous system (brain and nerves within spinal cord).

 ✓ Depressants are among the most widely used drugs in the world.

 ✓ These drugs operate by disrupting normal functioning of neurons – leading to symptoms such as drowsiness, relaxation, decreased inhibition, anesthesia, sleep, coma and possibly death.

 ✓ All depressants have the potential to be addictive.

 ✓ Stacking depressants is taking more than one type of depressant at the same time. Example: heroin + alcohol or other opiate and alcohol. The cumulative effect of stacking depressants is a depressed CNS, which leads to depressed heart and cardiovascular functioning, which could lead to death due to arresting the heart.
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

Presented by: Ehab El Kherrat, PhD
Heroin is processed from morphine, a naturally occurring substance extracted from the seedpod of the Asian poppy plant. Heroin usually appears as a white or brown powder. Street names for heroin include "smack," "H," "skag," and "junk." Other names may refer to types of heroin produced in a specific geographical area, such as "Mexican black tar.

Heroin abuse is associated with serious health conditions, including fatal overdose, spontaneous abortion, collapsed veins, and, particularly in users who inject the drug, infectious diseases, including HIV/AIDS and hepatitis.
**Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders**

How Does Oxycodone Work in the Body?

- **You take Oxycodone.**
- Oxycodone enters the bloodstream in seconds. Then, the heart pumps the blood throughout the body, carrying the drug with it.
- In the brain, Oxycodone undergoes several chemical reactions and changes back into morphine. Then, it binds rapidly to the opioid receptors to cause euphoria, pain relief, and diminished anxiety.

**Administration Routes and Onset**

- **Oral:** 10-30 minutes
- **Injecting:** 15-30 seconds
- **Snorting:** 2-4 minutes
- **Smoking:** 10 seconds

Oxycodone undergoes extensive first-pass metabolism in the liver before entering the body's circulation.

Oxycodone has a extremely rapid half life of 2-4 minutes and is eliminated mainly through the urinary tract. 7% is excreted as unchanged morphone, 50-60% as glucuronides.

---

**Hydrocodone**

- **Side effects of Vicodin**
  - Psychological: Anxiety, Dizziness, Drowsiness, Headache, Mood changes, Nausea, Nervousness, Vomiting
  - Skin: Hives, Rash, Redness
  - Lungs: Difficulty breathing, Shallow breathing
  - Intestinal: Constipation, Clay-colored stools
  - Urinary: Problems urinating, Dark urine

- **Side effects of Hydrocodone**
  - Central: Dizziness, Giddiness, Fuzzy thinking, Anxiety, Numbness, Loss of balance
  - Skin: Rash, Redness
  - Respiratory: Slurred speech, Shallow or irregular breathing, Chest tightness
  - Gastrointestinal: Nausea, Vomiting
  - Urinary: Difficulty urinating

**Presented by: Ehab El Kharrat, PhD**
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

Tramadol

- Central:
  - Hallucinations
  - Dizziness
  - Drowsiness
  - Insomnia
  - Headache
  - Nervousness
  - Agitation
- Nose:
  - Sore
- Mouth:
  - Sore
  - Blotched tongue
  - or lips
- Skin:
  - Itch
  - Rash
  - Tinting
  - Sweating
- Respiratory:
  - Difficulty
  - Breathing
- Intestinal:
  - Diarrhea
  - Constipation

Heroin: Short & Long Term Effects

Short-term effects of Heroin

- Central:
  - Euphoria
  - Alternately alert and drowsy state
- Mouth:
  - Dryness
- Skin:
  - Warm
  - Flushing
- Respiratory:
  - Slow
  - Breathing
- Muscular:
  - Weakness

Long-term effects of Heroin

- Central:
  - Addiction
  - Tolerance
  - Dependence
- Respiratory:
  - Pneumonia
- Circulatory:
  - Collapsed
  - Veins
- Liver:
  - Increased function
- Systemic:
  - Anoxia
Krokodil = Desomorphine
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

Sedative-Hypnotics

- its major therapeutic use is to cause sedation (with concomitant relief of anxiety) or to encourage sleep
- sedative: a drug that reduces anxiety without affecting motor or mental functioning
- hypnotics: drugs that produce drowsiness and encourage the onset and maintenance of a state of sleep

3 classes of Sedative-Hypnotics

- Barbiturates
- Benzodiazepines (benzos)
- Z-Hypnotics
**Xanax = Alprazolam**

**Side effects of Alprazolam**

- Drowsiness
- Light-headedness
- Dizziness
- Irritability
- Talkativeness
- Changes in sex drive or ability
- Changes in appetite
- Sleep disturbances
- Memory problems
- Confusion
- Hallucination
- Seizures
- Weakness
- Problems with coordination
- Yellowing of the skin or eyes
- Dry mouth
- Increased salivation
- Severe skin rash
- Other
- Weight changes

**Bodily effects of Cannabis**

- **Eyes:**
  - Reddening
  - Decreased intra-ocular pressure
- **Mouth:**
  - Dryness
- **Skin:**
  - Sensation of heat or cold
- **Heart:**
  - Increased heart rate
- **Muscles:**
  - Relaxation

Presented by: Ehab El Kharrat, PhD
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

DURATION OF EFFECTS

- smoked:
  - initial effect = 20 to 30 minutes
  - peak effect = 1 to 2 hours
  - length of effect = 2 to 4 hours

- eaten:
  - initial effect = ½ to 2 hours
  - peak effect = 1 to 6 hours
  - length of effect = 5 to 12 hours

- half-life:
  - in fatty tissues = 8 days
  - chronic users = 27 hours
  - casual users = 56 hours

EFFECTS on CNS

- ideas seem to flow more easily
- racing thoughts
- deeper connection to surroundings
- mood lift - euphoria
- anxiety
- disrupted linear thinking
- amotivational syndrome
- paranoia in some users

Presented by: Ehab El Kharrat, PhD
Stimulants
1. Cocaine
2. Crack
3. Amphetamines
4. Caffeine
5. Nicotine
6. Khat
7. Ephedrine
8. other stimulants
The coca leaf is grown mostly on the Andes Mountains in South America. Cocaine constitutes 0.5% to 1/5% of the leaf. Columbian cartels grow and control most of the cocaine in the world, although much of the smuggling into the U.S. is by Mexican gangs. The coca leaf is chewed with life or ash, and the stimulating juice is absorbed through the buccal mucosa in the mouth in three to five minutes.
Cocaine is associated with high levels of aggression and violence.

Inhibitions are suppressed, emotional triggers are overstimulated, and the fight/flight center is hyperactive, especially when cocaine and alcohol are used together which creates cocaethylene.

Cocaine’s cardiovascular effects include raised heart rate and blood pressure and damage to heart muscles, coronary arteries, and other blood vessels. Weakened vessel walls scar the heart with constriction bands.
Amphetamines

Psychological:
- Insomnia
- Aggressive behavior
- Paranoia
- Inconstant conversations
- Decreased appetite
- Increased alertness
- Inability
- Slurred speech
- Dizziness
- Confusion
- Hallucinations
- Obsessive behaviors
- Depression
- Panic attacks

Systemic:
- Hyperthermia
- Malnutrition
- Impaired immune system

Circulatory:
- High blood pressure
- Vascular damage in brain
- Clotting and stroke

Heart:
- Chest pain
- Rapid heart rate
- Heart attack

Liver:
- Damage

Eyes:
- Dilated pupils

Mouth:
- Grinding of teeth

Skin:
- Sweating
- Numbness

Respiratory:
- Shortness of breath

Muscular:
- Jerky movements
- Increased activity

Integumentary:
- Loss of coordination

Kidneys:
- Damage
Faces of Meth

✓ The “Faces of Meth” project began in Oregon and Montana.
✓ Colorado Meth Project: http://colorado.methproject.org/
✓ Not everyone looks like the people in these posters so be careful – attempting to scare clients has been shown to be counterproductive and ineffective.
✓ These posters also exhibit qualities of people who are malnourished and dehydrated – they could also be suffering from polydrug effects and/or other health conditions.

Crystal or Ice

73

74
Amphetamine Congeners

- Amphetamine congeners emulate the effects of amphetamine but have different chemical structures. Many diet pills and mood elevators (amphetamine congeners) mimic the actions of amphetamines but are not as strong.

-Congeners include Ritalin, Concerta, and Cylert and are used to treat ADHD.
-Adderall, Vyvanse, and Dexedrine have amphetamine structures.

- Between 3 and 7% of all school-age children, in the U.S., have ADHD.
- Non-stimulant drugs used to treat ADHD include Strattera, Intuniv and Texpr.

Health effects of caffeine

Positive effects
- increased attention
- decreased fatigue
- lower risk of cardiovascular disease
- lower risk of diabetes
- increased metabolic rate

Negative effects
- anxiety and addiction
- increased vasoconstriction and blood pressure
- reduced control of fine motor movements
- stimulation of urination
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

Nicotine: Chemical Gateway

Smoking cigarettes causes nicotine to enter the brain, where it activates neural pathways that lead to the reward center: the brain's reward dopamine system, a chemical that makes us feel good. This process is central to smoking, for positive behaviors such as eating drinking and having fun.

Imaging studies show that smoking tobacco affects the whole body.
Delivery: Smokeless Tobacco

- **Snus**: a moist powder tobacco product containing tobacco, salt, and sodium bicarbonate. It is consumed by placing it under the upper lip for extended periods of time.
- **Snuff**: a smokeless tobacco made from ground or pulverized tobacco leaves. It is insufflated or snuffed in to the nasal cavity, delivering a swift hit of nicotine and a lasting flavored scent.
- **Chew or dip**: a smokeless tobacco product consumed by placing a portion of the tobacco between the cheek and gum or upper lip teeth and chewing. Dipping tobacco is ground up. Chew is not ground and must be manually crushed with the teeth to release flavor and nicotine.
- **Hookah**: a water pipe that is single or multi-stemmed for vaporizing and smoking flavored tobacco in which the vapor or smoke is passed through a water basin before inhalation.
Smokeless tobacco is as addicting and as damaging as tobacco that is smoked, but causes less lung damage. Oral diseases are more common.

15% of pregnant women smoke. Reduced oxygen to the fetus can cause low birth weight, and miscarriage. Risk of crib death (SIDS) is also increased.

Tobacco companies spend $13.1 billion per year on advertising and marketing = $36 million per day.

Reasons for continued use: social context; ritual aspects/conditioned behavior; perception of being an adult and cool; desire to manipulate mood; desire to be rebellious; and/or perception that smoking is sexually attractive.
3. Hallucinogens
Physical effects of 
Lysergic acid diethylamide (LSD)

Systemic:
- Increased temperature

Mouth:
- Dryness

Blood:
- High blood pressure

Muscles:
- Numbness
- Weakness
- Tremors

Pupils:
- Dilation

Skin:
- Profuse sweating

Heart:
- Increased heart rate

Gastric:
- Nausea
Inhalants
Nitrites are a group of chemicals including cyclohexyl nitrite, amyl nitrite, and butyl nitrite. Nitrites are used mainly to enhance sexual experiences rather than to achieve a euphoric effect. Cyclohexyl nitrite is found in room deodorizers. Amyl nitrite comes in small, mesh-covered, sealed capsules that are popped or snapped in order to release the vapors. Because of this popping or snapping, these capsules are frequently called poppers or snappers. Butyl nitrite is often sold in small bottles that, like amyl nitrite capsules, are referred to as poppers. Nitrites are available in adult bookstores and shops and over the Internet.

Performance Enhancers
Steroids
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

The Paradox of Power

Potential Negative Side Effects

- Headaches
- Strokes and blood clots
- Severe acne on face and back
- High blood pressure and heart disease
- Liver damage
- Nausea
- Mood swings
- Bloating
- Urinary and bowel problems
- Impotence
- Enlarged prostate
- Reduced sperm count
- Shrinkage of the testicles
- Aching joints
- Aggressive behavior
- Increased risk of tendon injuries

Problems in men:
- Reduced breast size
- Enlarged clitoris
- Increase in facial and body hair
- Deepened voice
- Menstrual problems

Problems in men & women:
Biology of Addiction: The Brain

LEFT-BRAIN FUNCTIONS
- Analytic thought
- Logic
- Language
- Reasoning
- Science and math
- Women
- Numbers skills
- Right-hand control

RIGHT-BRAIN FUNCTIONS
- Art awareness
- Creativity
- Imagination
- Intuition
- Insight
- Holistic thought
- Music awareness
- 3-D forms
- Left-hand control
The nervous system...

- Houses 100 billion neurons (nerve cells)
- Each brain cell could have one or thousands of connections to other brain cells
- The right side of your brain controls the left side of the body
- The left side of the brain controls the right side of the body
- Your brain is full of nerve cells & no pain receptors.
- Doctors can operate on your brain while you're awake – you won't feel a thing
- Messages from your brain to any part of your body can travel as fast as 250 mph

The limbic system is where your emotions live
Memories are created by the limbic system
Drug memories & emotions are easily accessible
Drugs negatively impact systems

Prefrontal Cortex Problems:
- short attention span, impulsivity, procrastination, disorganization
- poor judgment, lack of empathy and insight

Anterior Cingulate Problems:
- gets stuck, worries, holds grudges, obsesses
- compulsions, addictions, oppositional/argumentative

Basal Ganglia Problems:
- increased anxiety, panic, conflict avoidance, pessimism, excessive motivation
- decreased: add-like symptoms, decreased motivation

Temporal Lobe Problems:
- emotional instability, memory problems, feelings of panic, aggression, headaches, learning problems

Deep Limbic System Problems:
- sad, moody, negative thoughts, low motivation, social isolation, loss of libido

Cerebellum Problems:
- gait/coordination problems, slowed thinking, slowed speech, impulsivity, poor conditioned learning

Natural Rewards:
- Food
- Water
- Sex
- Nurturing
dopamine is “the ultimate reward”

Activation of the reward pathway by addictive drugs

GABA pathways in a normal brain: GABA is the main inhibitory neurotransmitter in the central nervous system.
Module 2: The Central Nervous System

nerve cell = neuron

Information flow through neurons

Dendrites Collect electrical signals
Cell body Integrates incoming signals and generates outgoing signal to axon
Axon Passes electrical signals to dendrites of another cell or to an effector cell

nerve cells communicating
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

Presented by: Ehab El Kharrat, PhD
neurotransmitters...

Each NT has its own receptor
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

Presented by: Ehab El Kharrat, PhD
opiate receptor sites
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

- healthy surface
- daily drinking


scans pickup nt activity

Dopamine D2 Receptors Are Lower in Addiction

- Cocaine
- Meth
- Alcohol
- Heroin
- Control
- Addicted

10/07/22
Presented by: Ehab El Kharrat, PhD
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

Presented by: Ehab El Kharrat, PhD
• 18 year old – 3 year history of 4 times/week use of marijuana – underside surface view – decreased prefrontal cortex & temporal lobe activity.

• 16 year old – 2 year history of daily marijuana abuse – underside surface view – prefrontal & temporal lobe activity.


• Underside active view – off THC – increased deep left temporal activity.

• Underside active view – on THC – overall calming of activity.

Top-down activity – on THC – overall calming of activity.

Top-down active view – off THC – patchy increased uptake.

Normal view – top down surface view – full symmetrical activity.

39 yr. old – 25 years of frequent heroin use – front on surface view – marked overall decreased activity.
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

- 40 year old – 7 years on methadone – heroin 10 years prior – top down surface view – marked decrease in overall activity.

- 52 year old – 28 year history of frequent meth use – top down surface view – multiple holes across cortical surface.

- 24 year old – 2 year history of frequent cocaine use – top down surface view – multiple holes across cortical surface.

- 28 year old – 8 years heavy meth use – front on surface view – marked overall decreased activity.


- 45 year old – 27 year history of heavy use – smoking 3 packs of cigarettes & drinking 3 pots of coffee daily.
- Underside surface view – marked decreased overall activity.

New knowledge about which parts of the brain are involved in drug abuse and addiction has revealed new targets for medications development. These medications aim to:

- interfere with a drug’s reinforcing effects
- increase the value of natural rewards
- strengthen executive function/inhibitory control
- interfere with conditioning/create new memories
- counteract stress responses that lead to relapse
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

Presented by: Ehab El Kharrat, PhD
Growing a Grown-up Brain

Scientists have long thought that the human brain was formed in early childhood. But by scanning children's brains with an MRI year after year, they discovered that the brain undergoes radical changes in adolescence. Excess gray matter is pruned out, making brain connections more specialized and efficient. The parts of the brain that control physical movement, vision, and the senses mature first, while the regions in the front that control higher thinking don't finish the pruning process until the early 20s.

Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

Judgment last to develop

"If a teen is doing music, sports or academics, those are the connections that will be hard wired. If they're lying on the couch or playing video games or MTV, those are the cells and connections that are going to survive."

15-year-old male
non-drinker

15-year-old male
heavy-drinker

Brain activity while performing a memory task.
Heavy drinker is slower during this task.

Adolescent Addiction

Drug abuse starts early and peaks during the teen years. This increased risk is partly due to adolescents' heightened sensitivity to social influences (friends) and their still developing brain, particularly areas critical to judgment and impulse control.
**Should Referral for Detoxification be Considered?**

<table>
<thead>
<tr>
<th>Should Referral</th>
<th>Detoxification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NO</strong></td>
<td></td>
</tr>
<tr>
<td>Marijuana, Cocaine, Methamphetamine, Ecstasy, Anabolic steroids, LSD, Ketamine and PCP</td>
<td>No approved medicine to ease withdrawal</td>
</tr>
<tr>
<td></td>
<td>Acute intoxication, overdose, or comorbid medical problems may require detoxification</td>
</tr>
<tr>
<td><strong>RECOMMENDED</strong></td>
<td></td>
</tr>
<tr>
<td>Opioids</td>
<td>Withdrawal unpleasant but not life threatening</td>
</tr>
<tr>
<td></td>
<td>Well managed by approved medicine</td>
</tr>
<tr>
<td></td>
<td>Withdrawal without medication not recommended in current practice standards</td>
</tr>
<tr>
<td><strong>YES</strong></td>
<td></td>
</tr>
<tr>
<td>Alcohol, Benzodiazepines, Sedative hypnotics, GHB, Inhaled intoxicants</td>
<td>Withdrawal potentially life threatening</td>
</tr>
<tr>
<td></td>
<td>Assess risk of withdrawal and consider referral for detoxification</td>
</tr>
<tr>
<td></td>
<td>Well managed by approved medicine</td>
</tr>
</tbody>
</table>
Effective treatment generally requires many facets. Treatment providers are important in helping the patients to:

✓ manage physical withdrawal symptoms
✓ understand the behavioral and cognitive changes resulting from drug use
✓ achieve long-term changes and prevent relapse
✓ establish ongoing communication between physician and community provider to ensure coordinated care
✓ engage in a flexible treatment plan to help them achieve recovery
Medication Assistance:
Maintenance of Changes

Several different are available that may aid clients in the maintenance of changes:

➢ Sensitizing Agents (*Antabuse*)
➢ Agonists (*Methadone*)
➢ Partial Agonists/Partial Antagonist (*Chantix, Suboxone*)
➢ Antagonists (*Naltrexone*)

Maintenance of Changes:
Agonist Medications

• have similar structure and bind to same receptor sites as drug of abuse
• provide full activation at receptor site where it binds
• *Methadone* – a synthetic opioid that binds to the receptors activated by heroin and other opioids
  ✓ occupies mu opioid receptor
  ✓ provides relief from craving and withdrawal
  ✓ user does not experience euphoria or intoxication
### Maintenance of Changes: Antagonist Medications

- have similar structure and bind to same receptor sites as drug of abuse
- provide no activation at receptor site where it binds
- block full and partial agonists from binding at receptor sites
- decrease pleasure and reward from drug use
- may induce withdrawal symptoms when full agonist drugs are displaced by antagonist medication

---

### Maintenance of Changes: Partial Agonist Medications

- ✓ have similar structure and bind to same receptor sites as drug of abuse
- ✓ provide partial activation at receptor site where it binds
- ✓ provide relief from craving and withdrawal
- ✓ degree of activation less than a full agonist
- ✓ block full agonists from binding at receptor sites
- ✓ limit drug’s effect if substance is subsequently used
Agonist or Antagonist

Before Drug
- Natural chemical
- Receptor site
- Normal cellular activity

Agonist Drug
- Natural chemical
- Agonist drug
- Enhanced cellular activity

Antagonist Drug
- Natural chemical
- Antagonist drug
- Blocked cellular activity

Agonists and Antagonists
- Agonists: Drugs that occupy receptors and activate them.
- Antagonists: Drugs that occupy receptors but do not activate them. Antagonists block receptor activation by agonists.

(a) Receptor site on receiving neuron
- Agonist mimics neurotransmitter
- Antagonist blocks neurotransmitter

(b) No activation
- Blocking the receptor site

(c) Less activation
- Antagonist blocks neurotransmitter

(d) No activation
- Blocking the receptor site

163

164
Naltrexone is a long-acting opioid antagonist. It works by blocking the opioid receptors in the brain and therefore blocks the effects of heroin and other opioids. People who are under naltrexone protection can't achieve the "high" from using heroin. Naltrexone neither produces euphoria nor creates a new drug addiction.

Read more: naltrexonehelp.com
Vivitrol

Naloxone (also known as Narcan®) is a medication called an “opioid antagonist” used to counter the effects of opioid overdose, for example morphine and heroin overdoses. Specifically, naloxone is used in opioid overdoses to counteract life-threatening depression of the central nervous system and respiratory system, allowing an overdose victim to breathe normally. Naloxone is a non-scheduled (i.e., non-addictive), prescription medication. Naloxone only works if a person has opioids in their system; the medication has no effect if opioids are absent. Although traditionally administered by emergency response personnel, naloxone can be administered by minimally trained laypeople, which makes it ideal for treating overdose in people who have been prescribed opioid pain medication and in people who use heroin and other opioids. Naloxone has no potential for abuse. Naloxone may be injected in the muscle, vein or under the skin or sprayed into the nose. Naloxone that is injected comes in a lower concentration (0.4mg/1mL) than Naloxone that is sprayed up the nose (2mg/0.5mL). It is a temporary drug that wears off in 20-90 minutes.

http://harmreduction.org/issues/overdose-prevention/overview/overdose-basics/understanding-naloxone/
In order for Suboxone to work, it must occupy EMPTY opiate receptors or you could suffer from precipitated withdrawal.
Other medications used to help clients:

- Varenicline (Chantix) for nicotine dependence
- Bupropion (Wellbutrin) for cravings & triggers
- Nicorette (Nicotine) for nicotine dependence
- Acamprosate (Campral) for cravings
- Pregabalin (Lyrica) for cravings & triggers
- Duloxetine (Cymbalta) for anxiety associated with early recovery

Disulfiram (Antabuse®) is an FDA-approved sensitizing agent for alcohol dependence.

- Designed to sensitize the body to drug consumption -- causes adverse physical reaction when alcohol is consumed or otherwise administered.
- Antabuse®, a sensitizing medication, is designed for maintenance of changes, i.e., abstinence.
Treating Alcohol Dependence

**Acamprosate:**
- Quieting of physiological aspects of craving
- Less effective than Naltrexone in U.S. trials
- Most effective when used with people who have a minimum of 7-10 days abstinence
- Naltrexone averse patients may benefit from Acamprosate

**Disulfiram:**
- Strong deterrent to drinking
- Causes unpleasant physical effects when alcohol is consumed; reaction can be life threatening.
- Greatest benefit when combined with a psychosocial treatment that emphasizes medication compliance
- Can be effective as deterrent to returning to drinking

Treating Alcohol Dependence: Acamprosate (Campral)

- Acamprosate is believed to reduce the physiological aspects of craving.
- Mechanism of action is not fully understood.
  - Certain withdrawal symptoms and cravings are linked to hyper-excitability of the glutamate receptor
  - Acamprosate is thought to alleviate cravings for people in early sobriety by normalizing glutamate function
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

10/07/22

Presented by: Ehab El Kharrat, PhD
Stabilize Other Disorders

- Medication may serve to aid in the stabilization of the high rates of comorbid psychiatric diagnoses present in alcohol and drug use disorders.

- Presence of comorbid psychiatric disorder:
  - ✓ found in 45% of those with alcohol use disorder and 72% of those with drug use disorder
  - ✓ found in 78% of men and 86% of women with alcohol use disorder
Contextual Sensitivity
Brain Recovery: What Can Help?

Components of Recovery

- Hope
- Self-Directed
- Individualized and Person-Centered
- Empowerment
- Holistic
- Non-Linear
- Strengths-Based
- Peer Support
- Respect
- Responsibility

183
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

Presented by: Ehab El Kharrat, PhD
You don’t have to face your problems alone.
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

Image of the tryptophan amino acid: http://www.sciencephoto.com/media/6495/enlarge

Changes in who is starting to inject drugs


SOURCE: National Counts on Drug, Heroin and HIV, 2002-2011
53% of inmates in state prisons have a drug use disorder. Less than 15% receive treatment.

Types of Behavior Addictions

- Codependency
- Internet & Games
- Debit
- Shopping
- Work
- Love
- Sex
- Gambling
- Food & Eating
Youth At Risk For Substance Abuse

According to a University of Washington at Seattle research team, there are 10 factors that place adolescents at-risk for substance abuse, including abuse of prescription drugs:

Within the Community:
- Availability of drugs and firearms.
- Community laws and norms favorable toward drugs.
- Transitions and mobility (frequent relocation).
- Loss of neighborhood attachment and community disorganization.
- Extreme economic and social deprivation.

Within the family:
- Family history of high-risk behavior.
- Family management problems.
- Family conflict.
- Parental attitudes favorable toward drug use and parental substance abuse.

Within the school:
- Early and persistent antisocial behavior.
- Academic failure in elementary school.
- Lack of commitment to school.

Individual/Poor Group:
- Alienation and rebelliousness.
- Friends who engage in substance abuse.
- Favorable attitudes toward the problem behavior.
- Early initiation of the problem behavior.

Source: Adolescent Prevention Needs Assessment Survey, Fall 1992. by the Arkansas Department of Human Services, Division of Behavioral Health Services, Office of Alcohol and Drug Abuse Prevention.

Spheres of Influence

We're all addicted to something that takes the pain away.
Impact of Drug Abuse

- attention, consciousness
- learning & memory
- critical thinking skills
- executive functioning skills
- problem solving skills, goal setting, motivation
- social skills & life skills
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

Presented by: Ehab El Kharrat, PhD
DSM-5 and SUD

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), no longer uses the terms substance abuse and substance dependence, rather it refers to **substance use disorders**, which are defined as **mild, moderate, or severe** to indicate the level of severity, which is determined by the number of diagnostic criteria met by an individual.

http://www.samhsa.gov/disorders/substance-use

---

What is our goal as counselors, with a client struggling with a SUD?
Screening and Assessment

- co-occurring MH & SU/AB disorders
- trauma (PTSD, TBI)
- addictive behaviors and SUDs: **what, why**
- psych eval
- cultural formulation interview
- resources and supports
Treatment Planning

- determining stage of change
- case conceptualization: biopsychosocial
- case conceptualization: spiritual/emotional
- determining client’s motivation
- harm reduction versus abstinence
- relapse prevention (triggers & cravings)
- is MAT needed

Motivational Interviewing

[link to neurofav.com]
Basics of Addiction Counseling: Pharmacology of Psychoactive Substance Use Disorders

CBT

Contingency Management
Motivational Enhancement Therapy

Medication Assisted Treatment