

ETIOLOGY AND EPIDEMIOLOGY OF ADDICTION

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ETIOLOGY AND EPIDEMIOLOGY OF ADDICTION

Why are some people addicted to substances and others are not? What exactly is addiction, and just how bad is this problem in the US?

Course Objectives

- Participants will be able to state the definitions of addiction, etiology and epidemiology.
- Participants will be able to state no fewer than three facts about alcohol, nicotine, cocaine, opioids and cannabis
- Participants will be able to explain two brain changes that happen from substance use
- Participants will be able to state three facts about the prevalence of addiction
- Participants will be able to identify no fewer than three treatment and Recovery pathways

History of Alcohol

- Beer was probably a staple before bread
- The world's oldest known recipe is for beer
- Alcohol beverages have been produced for at least 12,000 years
- Early Egyptian writings urged mothers to send their children to school with plenty of bread and beer for their lunch
- A Chinese imperial edit of about 1,116 B.C. asserted that the use of alcohol in moderation was required to get into heaven

Prohibition: The Noble Experiment

- Convinced that alcohol was the cause of virtually all crime that on the eve of prohibition, some towns actually sold their jails.
- During the 1800's, temperance societies offered two pledge options: moderation in drinking or total abstinence. After those pledged total abstinence began writing "T.A." on their pledge cards, they became known as "teetotalers".
- Early temperance writers often insisted that because of their high blood alcohol content, "habitual drunkards" could spontaneously combust and burn to death from the inside
- During Prohibition, temperance activists hired a scholar to rewrite the Bible by removing all references to alcohol beverages.

History of Alcohol

- The nineteenth century brought a change in attitudes and the temperance movement began promoting the moderate use of alcohol—which ultimately became a push for total prohibition.
- There was debate over whether alcohol was the result or cause of poverty.
- Majority called alcohol the cause of poverty
- Between 1870-1915 half to two-thirds of U.S. Budget came from the liquor tax

History of Alcohol

- 1920 Eighteenth Amendment was passed making manufacture and sale of any beverage with greater than 0.5% illegal
- Prohibition was called “the noble experiment”
- Other countries such as Iceland, Russia, India, Finland and parts of Canada also implemented “the noble experiment”

History of Alcohol

- During prohibition the following benefits were identified:
- Decrease in cirrhosis and other alcohol related diseases
- Domestic Violence declined
- Violent crime dropped by 2/3
- Public drunkenness almost disappeared

History of Alcohol

- The illegal alcohol trade boomed and by 1933, the prohibition of alcohol was cancelled
- Alcoholism subsequently increased
- 1934 AA was founded by Bill Wilson and Dr. Bob Smith
- National Council on Alcoholism was founded in 1944 by first female member of AA, Marty Mann
- 1971, the Hughes Act...what contribution did this act make with regard to our profession as addiction specialists?
- The National Council advocated that alcoholism be considered a disease not a moral weakness

Facts about Cocaine

- The Incas and Spanish conquistadors used coca leaves for currency. Spaniards wanted to ban coca leaves as 'an evil agent of the devil' but decided against it when the Incas began to show a decrease in productivity in the fields and gold mines. The Incas were 'paid' in coca leaves, and literally ate their money
- Cocaine was invented in 1860 by a graduate student studying for his doctorate degree in Germany.
- Ophthalmologist Carl Koller discovered the anesthetic effects of cocaine and Freud later asked him to see if it could be used as a possible cure for morphine addiction.

Freud was only one of many coke-heads. Freud published 'Uber Coca' in 1884, extolling its virtues. Among others who enjoyed its benefits: Robert Louis Stevenson who is reported to have written Dr. Jekyll and Mr. Hyde during a 6-day coke binge. William Halsted, the man responsible for the use of rubber gloves during surgery also has a 'nose' for cocaine. Others include Thomas Edison, Jules Verne, H.G. Wells.

Cocaine was criminalized in large part due to racist reasons. In 1899, black Americans were able to buy Coca-Cola. Southern newspapers began to report on 'Negro Cocaine Fiends' raping white women. 1914, NY Times had an article entitled 'Negro Cocaine Fiends are a New Southern Menace'. That same year Dr. Edward Williams wrote in the Medical Standard: "The negro who has become a cocaine-doper is a constant menace to his community.' This led to the 1914 Harrison Narcotics Act which limited cocaine use to medicinal and scientific purposes.

- Cocaine use peaked in 1982. After the Harrison Narcotics Act, coke consumption declined until the 70's when it began to gain popularity as a 'non-addictive' recreational drug. By '82 there were 10.4 million annual users. A decrease in cocaine use began in 1998 with a reported percentage of 3.8 million annual users. By '07 it continued to decline to 2.1 m and by '12 it was down to 1.7m.
- The origin of 'crack cocaine' is impossible to trace. Arguments exist for it having been initiated on both coasts, and there is no evidence to indicate any one individual as the inventor.

Facts about Opioids

- In the mid to late 1800's opium was a fairly popular drug. Opium dens were scattered about the wild west due in large part to an influx of Chinese immigrants who came to work on the railroads. Wild Bill Hickock and Kit Karson were among many who frequented the dens.
- Opium was promoted as a cure for an even greater evil in the 1800's: Alcoholism.
- In 1810, morphine was developed as a pain reliever and considered a wonder-drug because it eliminated severe pain associated with surgery.
- The name 'morphine' is a derivative of the Greek God's name: Morpheus. He was the god of dreams.

- Tens of thousands of Confederate and Union soldiers during the Civil War became morphine addicts.
- By 1874, the answer to the morphine problem was thought to have been found in the invention of a new drug in Germany. This new drug was called....are you ready for this?....any guesses?



History of Opioid Use

1895 Bayer Co. manufactures heroin

1905 Congress bans opium

1930's "China White"

1971 Janis Joplin dies of

"accidental heroin overdose"

1973 Creation of DEA



History of Opioid Use



1970's "Mexican Mud"

1980's Golden Crescent: Iran, Afghanistan and Pakistan

1990's High-grade from Columbia

Facts about Nicotine

- Pre-Columbian Americans cultivated the plant and smoked it in pipes for medicinal and ceremonial purposes.
- Columbus brought a few tobacco leaves and seeds back with him to Europe.
- Nicotine was popularized in Europe in the mid-16th century when it was used by diplomats and adventurers like Jean Nicot of France: nicotine got its name from him.
- The first successful commercial crop was cultivated in Virginia in 1612 by Englishman John Rolfe. Within 7 years, it became the primary export.
- Though cigarettes existed since the 1600's, it wasn't popular until after the Civil War.

Facts about Nicotine

- It wasn't until the 1930's that the negative health effects of smoking and nicotine use were known.
- A statistical correlation between smoking and cancer was demonstrated, but no causal relationship had been shown until 1952.
- 1965, Surgeon General warnings on all packets began.
- 1971, TV advertisements were banned.
- 1990, smoking banned on all domestic flights.

Facts about Cannabinoids

- More than 45% of American adults report that they have used marijuana
- Marijuana has been consumed for at least 5,000 years and has a long history of traditional uses throughout Asia, Africa, Europe and the Americas.
- The marijuana plant contains more than 70 compounds, called cannabinoids, in its leaves and flowers.

Facts about Cannabinoids

- The most commonly known cannabinoid is tetrahydrocannabinol (THC) which is psychoactive.
- There are numerous other non-psychoactive cannabinoids in the plant.
- The price tag of marijuana prohibition is estimated at \$20B/year.
- About 46% to 58% of Americans today believe that marijuana should be legally regulated.

Facts about Cannabinoids

- 80% of Americans support the use of medical marijuana.
 - Marijuana has been shown to alleviate symptoms of a wide range of illnesses including: Cancer, HIV/AIDS, MS, Alzheimer's
 - PTSD, epilepsy, Crohn's Disease, glaucoma
 - Often effective alternative to narcotic painkillers.
- Long recognized as a gateway drug, evidence suggests that marijuana can also function as an 'exit' drug.

Etiology and Epidemiology of Addiction

Definitions

Etiology: the science dealing with the causes of diseases.

Epidemiology: the science concerned with the study of the factors determining and influencing the frequency and distribution of disease, injury and other health-related events and their causes.

Introduction to the science

HOW.....drugs and alcohol affect the brain

WHO.....are the vulnerable populations?

WHAT.....is the scope of the problem?

ASAM Public Policy Statement Definition of Addiction

ADDICTION.....

is a primary, chronic disease of brain reward, motivation, memory and related circuitry. Dysfunction in these circuits leads to characteristic biological, psychological, social and spiritual manifestations. This is reflected in an individual pathologically pursuing reward and/or relief by substance use and other behaviors.

ADDICTION.....

is characterized by inability to consistently abstain, impairment in behavioral control, craving, diminished recognition of significant problems with one's behavior and interpersonal relationships, and a dysfunctional emotional response. Like other chronic diseases, addiction often involves cycles of relapse and remission. Without treatment or engagement in recovery activities, addiction is progressive and can result in disability or premature death.

Long version go to: <http://www.asam.org/for-the-public/definition-of-addiction>

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- **Impairment** in behavioral control
- **Diminished** recognition of problems in behavior and interpersonal relationships
- **Dysfunctional** emotional response
- **Relapse** and remission
- **Progressive**
- **Possible** disability or premature death

Brain Structures & Addiction

The nucleus accumbens have been activated by dopamine

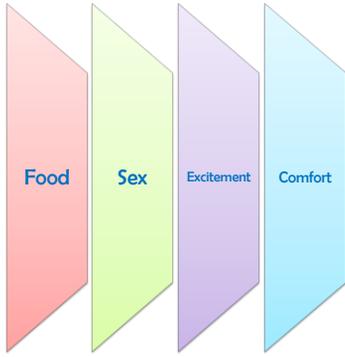
The human brain has reward centers that mediate the experience of pleasure

A ride in a fast car

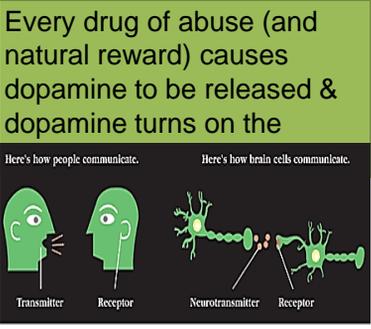
From chocolate

A buzz off a drug

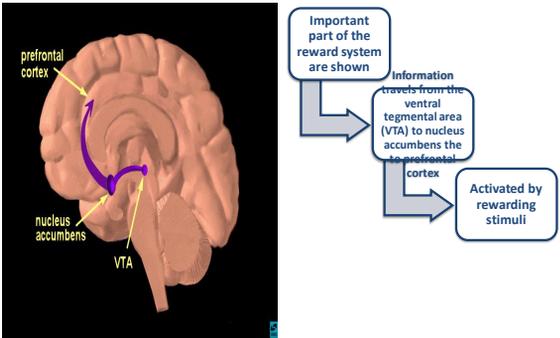
Natural Rewards

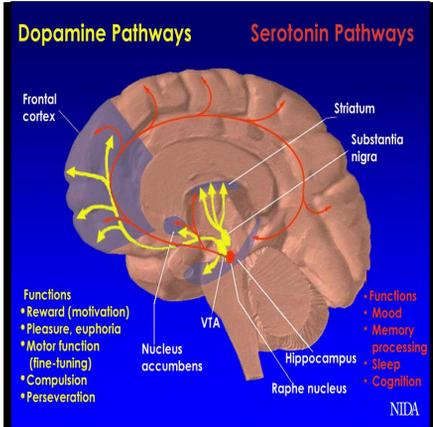


Dopamine



Reward Pathway





What we know

- There is a **GROWING** body of evidence of structural vulnerability of brains to the effects of intoxicating substances
- Several factors contribute to this vulnerability
 1. Genetics
 2. Early developmental influences and environmental factors
 3. Effects of stressful life events across the life cycle
 4. Mental disorders principally depression and anxiety

Brain & Behavior

The experience of **severe trauma, chronic depression, or long term abuse of alcohol/drugs**, all have been shown to result in loss of brain cells in the brain's memory-forming retrieving center, the hippocampus

Brain functioning under other insults-similarity to addiction

The long term effects of substance use and even long term untreated depression can reduce frontal lobe functioning

The frontal lobes are where planning, executive functions, emotional management, and reasoning occurs- AND this is the area of the brain that is most needed for recovery activities

Head injuries can produce similar effects in the frontal lobes

WHAT IS AFFECTED?

What is affected...?

The emotional systems of the brain are ungoverned and run rampant

Thinking gets completely rewired as the "normal" thinking areas get shut down

Everything gets oriented around feeling okay- feeding the craving and using to feel "normal" again

Are changes from drug use permanent?

There is increasing evidence of brain recovery from certain addictions.

Long term heavy alcohol use results in some permanent damage. Alcohol is perhaps the most harmful drug to the CNS.

Much of the damage done by alcohol can either be restored or the brain will develop compensations for the damages.

The fundamental neurochemical imbalances that were there before the addiction, may still need attention.

So, what about behavioral effects?

The areas of the brain that do self-reflection, assessment, planning and careful listening to feedback are all **damaged** by substance abuse

The frontal lobes are greatly **affected** by almost all substances

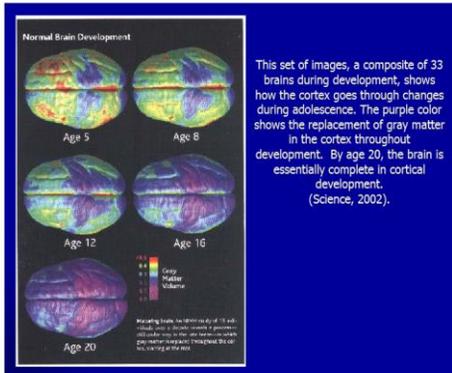
The addicted person **loses** the ability to invent solutions to problems

The bottom line

- Just saying “no” is unrealistic.
- Treatment may be needed and may also include medications to help the brain re-establish its equilibrium
- Science suggests the idea of “moral deviancy”. This is inappropriate and stigmatizing.

ADULTS ARE NOT THE ONLY ONES AFFECTED

WE CAN'T FORGET OUR KIDS



The Impact of Culture:

What IS culture: the beliefs, customs, arts, etc., of a particular society, group, place, or time

- a particular society that has its own beliefs, ways of life, art, etc.
- a way of thinking, behaving, or working that exists in a place or organization (such as a business)

Culture includes

- Beliefs
- Values
- Customs
- Religion
- Social class
- Minority status experience
- Experience of persecution, oppression
discrimination, inequity, hostility

Cultural Influence:

the power to change or affect someone or something; the power to cause changes without directly forcing them to happen

- Culture influences patterns of alcohol consumption
- European countries have higher per capita drinking rates than the United States
- Most Asian countries have a lower per capita consumption rate
- These differences result from a combination of physiological, cultural, social, religious, and legal factors as well as Wet vs. Dry cultures

Epidemiology

Why people use drugs and alcohol

"It's peer pressure...no, it's poor self-concept...it's just because it's fun and pleasurable...it's the hopelessness of our society... it's due to the dishonesty and hypocrisy of our institutions... no, it's our inability to connect with each other and establish effective relationships...it's the parents...it's the media that promote instant pleasure, short-term goals and alcohol use...it's the ineffectiveness of the school system and other institutions...it's the avoidance of pain and the hedonism of modern society...it's the lack of caring for our fellow human beings...it's stress, pressure, and the breakdown of the family...it's just available...why not..."

Drugs and Alcohol in Perspective

Four correlates and antecedents of drug use

Number 1

Demographic factors Early age of onset
Gender difference; heavier use among males

Number 2

- Social-environmental factors**
- Family/peer approval
 - Family/peer role models for use
 - Incompatibility between parents and peers
 - Absence of closeness to parents
 - Weak parental controls
 - Accessibility to drugs
 - Cultural Aspects and Contributors

Evidence Suggests:

- Many chronic diseases in adults are determined decades earlier, by experiences in childhood
- Risk factors/behaviors for these diseases are initiated during childhood or adolescence and continue into adult life.

- An ACE Score of 4 or more results in having multiple risk factors for these diseases or the disease themselves.
- An ACE score of 6 or more results in a 20 year decrease in life expectancy.



What are Adverse Childhood Experiences (ACEs)?

- Growing up (prior to age 18) in a household with:
- Recurrent physical abuse.
- Recurrent emotional abuse.
- Sexual abuse.
- Emotional or physical neglect.

What Are ACEs?

Adverse Childhood Experiences



ACEs are experiences in childhood that are unhappy, unpleasant, hurtful.

Sometimes referred to as toxic stress or childhood trauma.

Addiction Risk Factors/Vulnerable Populations

- Genetics
- Earlier Age of Onset
- Childhood Trauma (violent, sexual)
- Learning Disorders & ADD/ADHD
- Mental Illness Predating Use
 - Depression
 - Bipolar Disorder
 - Psychosis
 - ADHD

Neighboring States Fatal Overdose Epidemic

+ Increase over previous year

Connecticut

2013: 582
2014: 623 = +10.0%
2015: 728 = +16.8%

New Hampshire

2013: 203
2014: 334 = +73.5%
2015: 367 = +10.0%

Massachusetts

2013: 1,081
2014: 1,289 = +19.0%
2015: 1,406 = +9.1%

Rhode Island

2013: 239
2014: 247 = +3.2%
2015: 257 = +4.0%

All info collected from CDC and State Departments
