Exploring Myths about Addiction

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Disclosures

• None currently

• In the past:
  – Speakers Bureau for Orexo
    • (Zubsolv – buprenorphine/naloxone)
  – Speakers Bureau for Reckitt-Benckiser
    • (Suboxone – buprenorphine/naloxone)
Objectives:

- Understand the brain disease model of addiction
- Recognize the myths and biases that surround addiction
- Decrease stigma and improve open and unbiased communication about addicts
“It ain’t what you don’t know that gets you into trouble. It’s what you know for sure that just ain’t so.”

The Big Short
(falsely attributed to Mark Twain)
Review Article

Neurobiologic Advances from the Brain Disease Model of Addiction

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From the National Institute on Drug Abuse (N.D.V.) and the National Institute of Alcohol Abuse and Alcoholism (G.F.K.) — both in Bethesda, MD; and the Treatment Research Institute, Philadelphia (A.T.M.).
Terminology

• **Substance Abuse, Substance Dependence**
  – DSM IV-TR

• **Substance Use Disorder**
  – DSM-5: recurrent use of alcohol or other drugs that causes clinically and functionally significant impairment, such as health problems, disability, and failure to meet major responsibilities at work, school, or home. Depending on the level of severity, this disorder is classified as mild, moderate, or severe.

• **Addiction**
  – A term used to indicate the most severe, chronic stage of substance-use disorder, in which there is a substantial loss of self-control, as indicated by compulsive drug taking despite the desire to stop taking the drug.
What is Addiction?

**ASAM** - American Society of Addiction Medicine - Short 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 behaviors 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.
• When people see compulsive and damaging behaviors in friends or family members—or public figures such as celebrities or politicians—they often focus only on the substance use or behaviors as the problem.

• However, these outward behaviors are actually manifestations of an underlying disease that involves various areas of the brain.
“At its core, addiction isn’t just a social problem or a moral problem or a criminal problem. It’s a brain problem whose behaviors manifest in all these other areas,” said Dr. Michael Miller, past president of ASAM who oversaw the development of the new definition. “Many behaviors driven by addiction are real problems and sometimes criminal acts. But the disease is about brains, not drugs. It’s about underlying neurology, not outward actions.”
Statistics

- In the US 8 to 10% of people 12 years of age or older (20-22 million people) are addicted to alcohol or other drugs
- Abuse of tobacco, alcohol, and illicit drugs in the US exacts more than $700 billion annually in costs related to crime, lost work, productivity, and health care
Myth #1

• Drug addiction is a voluntary behavior
  – True, initial use is generally a voluntary behavior, but over time, as a result of changes in brain structure and function and it becomes an out of control compulsion
  – Exceptions

• If they really want to quit, they can
Drug Addiction is a Voluntary Behavior

- After centuries of efforts to reduce addiction and its related costs by punishing addictive behaviors failed to produce adequate results, recent basic and clinical research has provided clear evidence that addiction might be better considered and treated as an acquired disease of the brain.
Drug Addiction is a Voluntary Behavior

• Nonetheless, despite the scientific evidence and the resulting advances in treatment and changes in policy, the concept of addiction as a disease of the brain is still being questioned. The concept of addiction as a disease of the brain challenges deeply ingrained values about self-determination and personal responsibility that frame drug use as a voluntary, hedonistic act. In this view, addiction results from the repetition of voluntary behaviors.
Drug Addiction is a Voluntary Behavior

• True, initial use is generally a voluntary behavior

• Exceptions
  – Infants exposed to alcohol via baby bottle
  – Children raised in a drug rich environment (parents use and are unavailable, permissive social environment)
  – Pain management

• But over time, as a result of changes in brain structure and function and it becomes an out of control compulsion
Myth #2

• Drug addiction is a character flaw
  – Drug addiction is a brain disease. Every type of drug — from alcohol to heroin — has its own mechanism for changing how the brain functions.
  – But regardless of the addiction, the effects on the brain are similar, ranging from changes in the molecules and cells that make up the brain to mood and memory processes — even on motor skills such as walking and talking.
  – The drug becomes the single most powerful motivator in an addicts life.
Stages of Addiction

• Three recurring stages:
  – Binge and intoxication
  – Withdrawal and negative affect
  – Preoccupation and anticipation (craving)

• Specific neurobiologic circuits are involved in each stage

• A Vicious Cycle
Conceptual Framework for Neurobiological Bases of the Transition to Excessive Drinking
1. Binge and Intoxification

- dorsal striatum, nucleus accumbens, thalamus, and globus pallidus
- Activation of reward regions of the brain by causing sharp increases in the release of dopamine
- Triggers associative learning or conditioning
  - Pavlovian learning in which environmental stimuli are paired with drug use
    - Where the drug is taken, who it is taken with, the persons mental state before it is taken, all come to elicit conditioned, fast surges of dopamine release that can trigger craving for the drug
    - Deeply ingrained, can trigger craving long after drug use has stopped
2. Withdrawal and Negative Affect

• amygdala, nucleus accumbens, basal nucleus of the stria terminalis
• Decreased euphoria
• Increased reactivity to stress and emergence of negative emotions, a highly dysphoric phase of drug effects that ensues when the direct effects of the drug wear off or the drug is withdrawn
2. Withdrawal and Negative Affect

- As a result of these changes (decreased euphoria, increased reactivity to stress and emergence of negative emotions), the person with addiction transitions from taking drugs to feel pleasure or “get high,” to taking them to obtain transient relief from dysphoria.

- These changes become deeply ingrained and cannot be immediately reversed through simple termination of the drug (detoxification).
3. Preoccupation and Anticipation

- prefrontal cortex, orbitofrontal cortex, insula, hippocampus
- Changes to prefrontal cortex which is involved in executive decision making processes
  - Serious impairment in the capacity for self-regulation, decision making flexibility in the selection and initiation of action, attribution of salience and monitoring of error
  - Weakened ability to resist strong urges or to follow through on decisions to stop taking the drug
3. Preoccupation and Anticipation

• Explains why persons with addiction can be sincere in their desire and intention to stop using and simultaneously impulsive and unable to follow through on their resolve
Biologic and Social Factors

• Only a minority of people who use drugs become addicted

• Genetic, environmental, and developmental factors contribute to an individual’s unique susceptibility to:
  – Using drugs initially
  – Sustaining drug use
  – Progressive changes in the brain that characterize addiction
Biologic and Social Factors

• Family history
  – Heritability
  – Child rearing practices

• Early exposure to drug use
  – Adolescence

• Exposure to high risk environments
  – Socially stressful environments with poor familial and social supports
  – Environments in which there is easy access to drugs and permissive normative attitudes toward drug use

• Mental Illness
Biologic and Social Factors

• Approximately 10% of persons exposed to addictive drugs will develop the most severe characteristics of addiction
• We are not all born equally vulnerable to addiction
Myth #3

• You have hit “rock bottom” and want to change before treatment can be effective
  – There are many things that can motivate a person to enter and complete treatment before that happens. Pressure from family members and employers, as well as personal recognition that they have a problem, can be powerful motivators. For teens, parents and school administrators are often driving forces in getting them into treatment before situations become dire.
National Institute on Drug Abuse

• More than two decades of scientific research have yielded a set of fundamental principles that characterize effective drug abuse treatment. These 13 principles, which are detailed in NIDA's new research-based guide, Principles of Drug Addiction Treatment: A Research-based Guide, 3rd edition are:
Principles of Drug Addiction Treatment

1. **Addiction is a complex but treatable disease that affects brain function and behavior.** Drugs of abuse alter the brain’s structure and function, resulting in changes that persist long after drug use has ceased. This may explain why drug abusers are at risk for relapse even after long periods of abstinence and despite the potentially devastating consequences.

2. **No single treatment is appropriate for everyone.** Treatment varies depending on the type of drug and the characteristics of the patients. Matching treatment settings, interventions, and services to an individual’s particular problems and needs is critical to his or her ultimate success in returning to productive functioning in the family, workplace, and society.

3. **Treatment needs to be readily available.** Because drug-addicted individuals may be uncertain about entering treatment, taking advantage of available services the moment people are ready for treatment is critical. Potential patients can be lost if treatment is not immediately available or readily accessible. As with other chronic diseases, the earlier treatment is offered in the disease process, the greater the likelihood of positive outcomes.

4. **Effective treatment attends to multiple needs of the individual, not just his or her drug abuse.** To be effective, treatment must address the individual’s drug abuse and any associated medical, psychological, social, vocational, and legal problems. It is also important that treatment be appropriate to the individual’s age, gender, ethnicity, and culture.
Myth #4

• Treatment for drug addiction should be a one-shot deal
  – Like many other medical illnesses (asthma, hypertension, and diabetes) addiction is a chronic disorder. Some people can just quit or get well after just one treatment episode, but most people require longer-term treatment and, in many instances, repeated treatments.
Principles of Drug Addiction Treatment

5. **Remaining in treatment for an adequate period of time is critical.** The appropriate duration for an individual depends on the type and degree of the patient’s problems and needs. Research indicates that most addicted individuals need **at least 3 months in treatment to significantly reduce or stop their drug use and that the best outcomes occur with longer durations of treatment.** Recovery from drug addiction is a long-term process and frequently requires multiple episodes of treatment. As with other chronic illnesses, relapses to drug abuse can occur and should signal a need for treatment to be reinstated or adjusted. Because individuals often leave treatment prematurely, programs should include strategies to engage and keep patients in treatment.

6. **Behavioral therapies—including individual, family, or group counseling—are the most commonly used forms of drug abuse treatment.** Behavioral therapies vary in their focus and may involve addressing a patient’s motivation to change, providing incentives for abstinence, building skills to resist drug use, replacing drug-using activities with constructive and rewarding activities, improving problem-solving skills, and facilitating better interpersonal relationships. Also, participation in group therapy and other peer support programs during and following treatment can help maintain abstinence.
7. Medications are an important element of treatment for many patients, especially when combined with counseling and other behavioral therapies. For example, methadone, buprenorphine, and naltrexone (including a new long-acting formulation) are effective in helping individuals addicted to heroin or other opioids stabilize their lives and reduce their illicit drug use. Acamprosate, disulfiram, and naltrexone are medications approved for treating alcohol dependence. For persons addicted to nicotine, a nicotine replacement product (available as patches, gum, lozenges, or nasal spray) or an oral medication (such as bupropion or varenicline) can be an effective component of treatment when part of a comprehensive behavioral treatment program.

8. An individual's treatment and services plan must be assessed continually and modified as necessary to ensure that it meets his or her changing needs. A patient may require varying combinations of services and treatment components during the course of treatment and recovery. In addition to counseling or psychotherapy, a patient may require medication, medical services, family therapy, parenting instruction, vocational rehabilitation, and/or social and legal services. For many patients, a continuing care approach provides the best results, with the treatment intensity varying according to a person’s changing needs.
Principles of Drug Addiction Treatment

9. **Many drug-addicted individuals also have other mental disorders.** Because drug abuse and addiction—both of which are mental disorders—often co-occur with other mental illnesses, patients presenting with one condition should be assessed for the other(s). And when these problems co-occur, treatment should address both (or all), including the use of medications as appropriate.

10. **Medically assisted detoxification is only the first stage of addiction treatment and by itself does little to change long-term drug abuse.** Although medically assisted detoxification can safely manage the acute physical symptoms of withdrawal and can, for some, pave the way for effective long-term addiction treatment, detoxification alone is rarely sufficient to help addicted individuals achieve long-term abstinence. Thus, patients should be encouraged to continue drug treatment following detoxification. Motivational enhancement and incentive strategies, begun at initial patient intake, can improve treatment engagement.

11. **Treatment does not need to be voluntary to be effective.** Sanctions or enticements from family, employment settings, and/or the criminal justice system can significantly increase treatment entry, retention rates, and the ultimate success of drug treatment interventions.
12. Drug use during treatment must be monitored continuously, as lapses during treatment do occur. Knowing their drug use is being monitored can be a powerful incentive for patients and can help them withstand urges to use drugs. Monitoring also provides an early indication of a return to drug use, signaling a possible need to adjust an individual’s treatment plan to better meet his or her needs.

13. Treatment programs should test patients for the presence of HIV/AIDS, hepatitis B and C, tuberculosis, and other infectious diseases as well as provide targeted risk-reduction counseling, linking patients to treatment if necessary. Typically, drug abuse treatment addresses some of the drug-related behaviors that put people at risk of infectious diseases. Targeted counseling focused on reducing infectious disease risk can help patients further reduce or avoid substance-related and other high-risk behaviors. Counseling can also help those who are already infected to manage their illness. Moreover, engaging in substance abuse treatment can facilitate adherence to other medical treatments. Substance abuse treatment facilities should provide onsite, rapid HIV testing rather than referrals to offsite testing—research shows that doing so increases the likelihood that patients will be tested and receive their test results. Treatment providers should also inform patients that highly active antiretroviral therapy (HAART) has proven effective in combating HIV, including among drug-abusing populations, and help link them to HIV treatment if they test positive.

Myth #5

• People don’t need treatment, they can just stop if they really want to
  – It can be extremely hard for people with severe addiction to achieve and maintain long-term abstinence
  – Changes in brain function makes it increasingly difficult to quit without effective treatment
Myth #6

- Treatment just doesn’t work (they all relapse)
  - Treatment reduces drug use by 40-60%
  - There is reduced criminal activity during and after treatment
  - Treatment decreases the risk of infectious disease (Hepatitis C and HIV)
  - Treatment improves the prospect for getting and keeping a job
Myth #7

- People who continue to use drugs after treatment are hopeless
  - The struggle for recovery can last a lifetime
  - Occasional relapses do not mean failure
  - Recovery is a long process that frequently requires multiple treatment attempts before complete and consistent sobriety can be achieved
The Opioid Overdose Epidemic

• Prescription opioids kill more people than heroin
• Most heroin users started with prescription opioids
• Opioid use disorders are seen in persons from all educational and socioeconomic backgrounds
Opioids: Rx and Heroin

• In the US an estimated 400,000 persons have used heroin in the past month
• Over 4 million have reported nonmedical use of prescription pain relievers
• The combined death toll from both heroin and prescription opioids was over 30,000 people last year
• Approximately 3 million persons in the US nad almost 16 million worldwide have a current or past opioid use disorder
• The global burden of disease from opioid related conditions approaches 11 million life-years lost from health problems, disabilities. and early death
Buprenorphine and buprenorphine/naloxone

- Buprenex – injectable analgesic
- Suboxone – sublingual film
- Zubsolv – sublingual tablet
- Bunavail – buccal film
- Probuphine – subdermal implant
- Butrans – transdermal patch
- Generic buprenorphine (mono product)
- Generic buprenorphine/naloxone (combination product)
MAT – Medication Assisted Treatment

• “Scientific evidence suggests that maintenance treatment with these medications in the context of behavioral treatment and recovery support are more effective in the treatment of opioid use disorder than short-term detoxification programs aimed at abstinence,” said Nora Volkow, M.D., director of the National Institute on Drug Abuse at the National Institutes of Health.

• High relapse rate without MAT – 90%
A World Health Organization (WHO) study ranks drug addiction as the most stigmatized social problem. In addition, a 2010 study published by the International Journal of Drug Policy found that even doctors are influenced by derogatory drug language.

<table>
<thead>
<tr>
<th>Negative, pejorative</th>
<th>preferred</th>
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</thead>
<tbody>
<tr>
<td>addict, abuser, junkie</td>
<td>Person in active addiction, person with a substance use disorder</td>
</tr>
<tr>
<td>Clean, dirty</td>
<td>Negative, positive, substance-free</td>
</tr>
<tr>
<td>Substitution, replacement</td>
<td>Medication Assisted Treatment</td>
</tr>
<tr>
<td>Lapse, Relapse</td>
<td>Reccurence</td>
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Naloxone

• Antagonist at the mu opioid receptor
• An antidote for opioid overdose
• No potential for abuse; side affects are rare
• Simple, easy to administer
• Available over the counter at many pharmacies
• It saves lives!
Criticisms of the Brain Disease Model of Addiction and Counter-Arguments

Neurobiologic Advances from the Brain Disease Model of Addiction, Supplementary Appendix

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1. Most people with addiction recover without treatment, which is hard to reconcile with the concept of addiction as a chronic disease.

   - This reflects the fact that the severity of addiction varies, which is clinically significant for it will determine the type and intensity of the intervention. Individuals with a mild to moderate substance use disorder, which corresponds to the majority of cases, might benefit from a brief intervention or recover without treatment whereas most individuals with a severe disorder will require specialized treatment.
2. Addicted individuals respond to small financial rewards or incentives (contingency management), which is hard to reconcile with the notion that there is loss of control in addiction.

- As described here, some of the behavioral abnormalities associated with addiction follow from the learned or conditioned pairing of situational cues with the powerful incentives of the drug effects. The demonstrated effectiveness of contingency management shows that financial cues and incentives can compete with drug-cues and incentives—especially when those financial incentives are significant and relatively immediate; and when control has been simply eroded rather than lost. Contingency management is increasingly being utilized in the management of other medical disorders to incentivize behavioral changes (i.e., compliance with medications, diets, physical activity).
Criticisms of the Brain Disease Model of Addiction and Counter-Arguments

3. Gene alleles associated with addiction only weakly predict risk for addiction, which is hard to reconcile with the importance of genetic vulnerabilities in the Brain Disease Model of Addiction.

- This phenomenon is typical of complex medical diseases with high heritability rates for which risk alleles predict only a very small percentage of variance in contrast to a much greater influence of environmental factors (i.e., cirrhosis, diabetes, asthma, cardiovascular disease). This reflects, among other things, that the risk alleles mediate the response to the environment; in the case of addiction, the exposures to drugs and stressful environments.
Criticisms of the Brain Disease Model of Addiction and Counter-Arguments

4. Overlaps in brain abnormalities between people with addiction and control groups, raises questions on the role that brain abnormalities have on addiction.
   - The overlap is likely to reflect the limitation of currently available brain imaging techniques (spatial and temporal resolutions, chemical sensitivity), our limited understanding of how the human brain works, the complexity of the neurobiological changes triggered by drugs and the heterogeneity of substance use disorders.
5. Treatment benefits associated with the Brain Disease Model of Addiction have not materialized.

- Medications are among the most effective interventions for substance use disorders for which they are available (nicotine, alcohol and opiates). Moreover, progress in the approval of new medications for substance use disorders has been slowed by the reluctance of pharmaceutical companies to invest in drug development for addiction.
6. The Brain Disease Model of Addiction neglects public health policies in favor of biomedical treatments.

- This is questioned on the basis of dollars spent by the National Institute of Drug Abuse (NIDA) and the National Institute of Alcohol Abuse and Alcoholism (NIAAA) on research on public health versus biomedical treatments. However, the issue is not the need for more research on public health policies since many already exist but rather for their implementation. On the other hand, there are few biomedical treatments currently available for substance use disorders and so this area remains a priority.
7. Benefits to policy have been minimal.

- The Brain Disease Model of Addiction created the foundations for the Patient Protection and Affordable Care Act and provision of health-care through Obamacare. Thus the Brain Disease Model of Addiction provided the basis for patients to be able to receive treatment for their addiction and for insurances to cover for it. This is a monumental advance in health policy. The Brain Disease Model of Addiction also provides key evidence –based science for retaining the drinking age at 21 years.
Buprenorphine

• Partial agonist at mu opioid receptor
• Very high binding affinity/slow dissociation constant
• 37 hour half-life
  – vs. 3-4 hour half-life for oxycodone
• Effective analgesic
• Effectively decreases craving and relapse
• Ceiling effect on respiratory depression