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Medications and Hope: "Navigating the Path to Recovery From Drug Abuse"

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ABSTRACT: Drug abuse is a significant public health concern that involves the excessive and inappropriate consumption of psychoactive substances, leading to detrimental physical, psychological, social, and economic consequences. This abstract provides an overview of drug abuse, including its definition, prevalence, risk factors, and associated health issues. It discusses the neurobiological mechanisms underlying addiction, highlighting the role of neurotransmitters and brain circuits in reinforcing drug-seeking behavior. Various classes of drugs commonly abused, such as opioids, stimulants, depressants, hallucinogens, and cannabinoids, are described, along with their short-term and long-term effects on the body and mind. The abstract also emphasizes the importance of prevention, intervention, and treatment strategies in addressing drug abuse, encompassing educational campaigns, counseling, medication-assisted therapies, and behavioral interventions. Societal challenges related to stigma, policy, and access to care are acknowledged, and the need for a comprehensive and multidisciplinary approach to combat drug abuse is emphasized. By understanding the complexities of drug abuse and its impact on individuals and communities, stakeholders can work towards reducing its prevalence and mitigating its far-reaching consequences. Medication plays a crucial role in addressing the complexities of drug abuse and addiction, offering a multifaceted approach to treatment and recovery. This abstract provides an overview of medication-based interventions for drug abuse, highlighting their significance in mitigating withdrawal symptoms, reducing cravings, and promoting long-term abstinence. It explores pharmacotherapy options across various classes of abused substances, including opioids, alcohol, stimulants, and nicotine, detailing the mechanisms of action and effectiveness of medications such as methadone, buprenorphine, naltrexone, acamprosate, and varenicline. The abstract also discusses the integration of medication-assisted treatment (MAT) with behavioral therapies, emphasizing the synergistic impact of combining psychosocial support with pharmacological interventions. Challenges related to patient adherence, individualized treatment plans, and potential side effects are addressed, along with the importance of a comprehensive assessment by healthcare providers. Additionally, the abstract underscores the need for ongoing research and innovation in developing new medications to target emerging drug abuse trends and enhance treatment outcomes. By recognizing the pivotal role of medication in the continuum of care for drug abuse, healthcare professionals and stakeholders can contribute to more effective and holistic approaches to combating addiction and supporting individuals on their path to recovery.

Key words: Drug abuse, dose, medications, receptor

I. INTRODUCTION

Drug abuse refers to the harmful and excessive use of legal or illegal substances that can have negative effects on an individual's physical health, mental well-being, and social interactions. This behavior involves taking substances in amounts or ways that are not intended or recommended, often leading to addiction, impaired functioning, and a range of adverse consequences.

Substances commonly associated with drug abuse include alcohol, prescription medications, illegal drugs (such as cocaine, heroin, and methamphetamine), and even certain legal substances like tobacco and over-the-counter medications. Drug abuse can have a significant impact on an individual's life, affecting their relationships, work or school performance, and overall quality of life.

Substance abuse is a common phenomenon in the world and has invaded human society as the most important social damage. [1,2]

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Substance abuse is a nonadaptive model of drug use, which results in adverse problems and consequences, and includes a set of cognitive, behavioral, and psychological symptoms.[3] The World Health Organization's report in 2005 shows that there are about 200 million opiate addicts in the world. The onset of drug use is often rooted in adolescence, and studies show that substance abuse is often related to cigarette and alcohol consumption in adolescence.[6]Result of study indicate that age, being male, high-risk behaviors, and the existence of a cigarette smoker in the family or among friends, the experience of substance abuse, inclination and positive thoughts about smoking have relationship with adolescent cigarette smoking.[7]

Drug abuse refers to the use of a drug for purposes for which it was not intended or using a drug in excessive quantities. All sorts of different drugs can be abused including illegal drugs (such as heroin and cannabis), prescription medicines (pain killers) and the other medicines that can be bought off the supermarket shelves (cough mixtures).

DRUG CATEGORIES

Drugs of abuse fall into three groups and these include:

Depressants: These cause depression of the brain's faculties and examples include sleeping pills (barbiturates) and heroin.

Stimulants: These cause stimulation of the brain, giving rise to alertness and increased bursts of activity. A rapid heart rate, dilated pupils, raised blood pressure, nausea or vomiting and behavioral changes such as agitation, and impaired judgment may also result. In severe cases, there may be delusional psychosis which can occur with the use of cocaine and amphetamines.

Hallucinogens: These cause hallucinations and an "out of this world" feeling of dissociation from oneself. Hallucinogens may cause distorted sensory perception, delusion, paranoia and even depression. Examples include ecstasy, mescaline and LSD.

Examples of drugs are:

- Alcohol
- Tobacco
- Cocaine from coca
- Opium and opioids from poppy plants
- Hashish or marijuana from cannabis
- Synthetic drugs such as heroin, ecstasy and LSD

ALCOHOL

Alcohol is a psychoactive substance that has been consumed by humans for centuries for various purposes, including social, cultural, and recreational reasons. It is a central nervous system depressant that can have both short-term and long-term effects on the body and mind. While moderate alcohol consumption is considered socially acceptable and even associated with certain health benefits, excessive and irresponsible use can lead to a range of negative consequences, including addiction, health problems, and impaired judgment.

Regular binge drinking can lead to an alcohol use disorder (AUD), which is defined as a problematic pattern of alcohol use accompanied by clinically significant impairment or distress4 (Box 2). AUD may be accompanied by co-occurring psychiatric disorders (e.g., drug use disorders, major depressive and bipolar I disorders, specific phobias, and antisocial and borderline personality disorders)5 and by somatic and psychosocial problems (e.g., liver disease; pancreatitis; cancer of the head, neck, liver, colon, and rectum; accidental injuries, aggression, violence, and suicide).6,7 Worldwide, 5.9% of deaths (7.6% in men, 4.0% in women) are attributable to alcohol, with the leading causes of alcohol-associated deaths being cardiovascular disease and diabetes (33.4%), injuries (17.1%), gastrointestinal diseases (16.2%) and cancers (12.5%).7 Heavy alcohol use is also commonly associated with psychiatric disorders.

MEDICATION

Patients with an AUD often have co-occurring psychiatric disorders,5 though psychiatric symptoms (e.g., depressed mood) often diminish or resolve with a reduction in heavy alcohol use or abstinence from alcohol.,41 Persistent symptoms even with abstinence may require pharmacological treatment. When psychiatric symptoms persist despite a substantial reduction or cessation in drinking, the optimal approach is to continue the alcohol pharmacotherapy and add a specific psychiatric medication.

FDA – approved medication for treating AUD

Disulfiram, first approved for treating AUD in 1949, inhibits aldehyde dehydrogenase, which metabolizes acetaldehyde, a toxic metabolite of alcohol. Inhibiting the enzyme rapidly increases the concentration of acetaldehyde and produces a disulfiram-ethanol reaction (DER) characterized by nausea, flushing, vomiting, sweating, hypotension,

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palpitations, and rarely, serious reactions including cardiovascular collapse. only adverse event that was significantly more frequent in the group that received 250 mg/day of disulfiram, other than those related to the disulfiram-ethanol interaction, was drowsiness, which was moderate or severe in 8% of patients treated with that dosage.23

Naltrexone is a non-selective antagonist of mu, kappa, and delta opioid receptors that was initially approved to treat opioid dependence. By reducing mesolimbic opioid ergic activity and thereby modulating the dopamine-mediated rewarding effects of alcohol, it reduces alcohol consumption. Two dose levels (190 mg/month and 380 mg/month) of a long-acting, injectable formulation of naltrexone that was developed to increase medication adherence and bioavailability.

Acamprosate, approved to treat AUD, modulates glutamatergic neurotransmission, which may underline its efficacy in treating AUD. The FDA-approved daily dosage of the drug is 1998 mg.

Non-FDA approved medications for treating AUD

Nalmefene is a mu- and delta-opioid receptor antagonist and a kappa-opioid receptor partial agonist. patients with alcohol dependence, including men who consume more than 60 g (approximately four standard drinks) per day of ethanol or women who consume more than 40 g (approximately three standard drinks) per day (see Box 1 for the definition of a standard drink).

Baclofen, a GABA-B receptor agonist, is FDA approved to reduce spasticity associated with neurological disorders.

Recovery therapy

Detox and withdrawal treatment may begin with a program of detoxification — withdrawal that's medically managed. Sometimes called detox, this generally takes 2 to 7 days. You may need to take sedating medications to prevent withdrawal symptoms. Detox is usually done at an inpatient treatment center or a hospital.

Injected medication.**Vivitrol,** a version of the drug naltrexone, is injected once a month by a health care professional. Although similar medication can be taken in pill form, the injectable version of the drug may be easier for people recovering from alcohol use disorder to use consistently.

Alcohol use disorder commonly occurs along with other mental health disorders. If you have depression, anxiety or another mental health condition, you may need talk therapy (psychotherapy), medications or other treatment.

Combining psychosocial treatment with alcohol treatment

Psychosocial interventions have been shown to be efficacious in treating heavy alcohol use or AUD.9 These include brief interventions, motivational enhancement therapy, cognitive-behavioral therapy, behavioral approaches, family therapies, and 12-step facilitation.9 Of these, brief interventions, which are commonly 15–20 minutes in duration, are most feasible in medical settings. When more intensive psychosocial therapy is needed (e.g., cognitive-behavioral therapy), it may be most feasible for a therapist trained in the specific method to provide it, in concert with a medical practitioner who can prescribe an alcohol treatment medication.

SMOCKING

Tobacco use is one of the leading preventable causes of death in the world, killing up to half of users with a particularly high toll on patients with mental health and addiction problems. There are several explanations for the high sustained smoking rate among AUD patients. Studies have identified a shared genetic predisposition to nicotine and alcohol [5]. This results in both nicotine and alcohol triggering the release of dopamine in the reward pathway, possibly producing an increased effect [5, 6]. Furthermore, mental health problems are common in AUD patients, and nicotine may often be used as a sort of self-medication to relieve psychiatric symptoms [1]. Smoking also counters the sedative and cognitive effects of alcohol and decreases the withdrawal symptoms [3]. Smoking may also act as a gateway drug to AUD and other SUDs and be part of a drug-taking culture as alcohol increases the urge to smoke due to its disinhibiting effects [7].

MEDICATION

Nicotine is an addictive ingredient in tobacco. Nicotine replacement therapy may help you curb cravings and wean you off tobacco. And that’s something you want to do. Medications to help you quit smoking. Your local drug store stocks several nicotine replacement products over the counter. These include patches, lozenges and gum. Other products, like pills, inhalers and nasal sprays, need a doctor’s prescription.

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The patch: Once a day, you apply a small, latex patch on your upper body skin. It delivers a steady dose of nicotine. This makes it a good choice for heavy smokers.
Side effects are skin rash, allergy, sleep problems or unusual dreams Racing heartbeat.

Lozenges: Candy-like lozenges are great for a quick fix of nicotine. You place the lozenge in your mouth. It may take five to 10 minutes to feel the effect. Lozenges should dissolve within 30 minutes. Lozenges also may satisfy the need to keep your mouth busy, so you're not tempted to smoke.
Side effects are nausea and hiccups.

Gum: Nicotine gum starts to work within five to 10 minutes — if you use it correctly. It comes in different flavors and two doses. Gum works only if you follow the instructions and use the proper dose.
Side effects are hiccups, nausea, and dentures.

Inhalers: The inhaler is a plastic tube like the size and shape of a pen. When you take a puff, it instantly releases nicotine. It simulates the act of smoking. But you don't inhale.
Side effects are coughing and throat irritation.

Nasal spray: Nasal sprays are similar in size and shape to allergy or congestion nasal sprays. Yet, you shouldn't inhale the spray in your sinus cavities. Instead, you let the spray sit in your nostril. Nasal sprays are easy to use. And they quickly send nicotine to your bloodstream. Nasal sprays work best for heavy smokers who get strong craving.
Side effects are nasal irritation, runny nose and watery eyes. Can harm children and pets.

Chantix (Varenicline): Chantix (Varenicline) is a prescription medication taken as a pill, twice a day. It's the most effective single product to help you quit smoking. And it doesn't contain nicotine. It cuts cravings by acting like nicotine on the brain.
Chantix (Varenicline) binds to the nicotine receptors in your brain. It blocks the receptors, so smoking a cigarette won't be as satisfying. It also triggers some of the same reward effects of nicotine. This helps reduce withdrawal symptoms and cravings.
Side effects are nausea, vivid dreams and intestinal gas.

Zy band (Bupropion): Zy band (Bupropion) is a prescription medication taken as a pill. Like Chantix (Varenicline), it doesn't contain nicotine. It works by blocking nicotine receptors in your brain.
Side effects are insomnia, dry mouth and mild hand tremors.

E-cigarettes aren't effective quitting aids

No evidence exists to show that e-cigarettes are safe or that they can help you quit smoking. Yet, some people do use them and manage to quit. "We don't recommend using e-cigarettes as a strategy to help smokers quit," Karam-Hage says. "Sooner or later, smoking them can bring a smoker back to cigarettes."

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OPOIDS

Morphine is commonly considered to be the archetypal opioid analgesic and the agent to which all other painkillers are compared. Though morphine is the most widely known extract of P. somniferum, four naturally occurring alkaloids (plant-derived amines) can be isolated from it: morphine, codeine, papaverine and thebaine.

Opioids can be categorized according to the type of opioid receptor at which they produce their effects. Classically, there are considered to be three opioid receptors. These receptors are all G-protein coupled receptors, and were originally named mu (after morphine, its most commonly recognized exogenous ligand), delta (after vas deferens, the tissue within which it was first isolated) and kappa (after the first ligand to act at this receptor, ketocyclazocine).

MEDICATIONS

Clinically, there are two general treatment paths from which to choose, opioid maintenance treatment or detoxification. Most opioid dependent individuals engage in both, likely multiple times, during their drug-using careers. Agonist and partial agonist medications are commonly utilized for both maintenance and detoxification purposes; alpha-2-adrenergic agonist medications are primarily used to enhance detoxification outcomes. Antagonist medications are used to accelerate the detoxification process and prescribed post-detoxification to assist in preventing relapse.

Agonist medication for opioid dependence

Methadone is a full mu-opioid receptor agonist, typically used as a replacement therapy for heroin or other opioid dependence. Methadone's slow onset of action when taken orally and long elimination half-life (24–36 hours) allows it to be used as either a maintenance therapy or detoxification agent 3.

Maintenance: Adequate dosing ranges from 80 – 150 mg, typically beginning with a daily dose of 20–30 mg with increases of 5 or 10 mg until the optimal dose is reached. Methadone maintenance treatment (MMT) is associated with retention in treatment, and reductions in IV drug use, criminal activity, and HIV risk behaviors and mortality 4-7.

Detoxification: Methadone dose tapering, or detoxification is controversial given the relative effectiveness of MMT and the low rates of detoxification success 2. Methadone dose reduction schedules have ranged from 2–3 weeks to as long as 180 days, with longer time periods generally associated with better outcomes. Studies have indicated that the more rapid the reduction, the worse the treatment retention and heroin use outcomes are, although the optimal timeframe has yet to be clearly delineated.

Levomethadyl acetate or LAAM, a longer acting derivative of methadone and full mu-opioid agonist substitute was approved by the US Food and Drug Administration for maintenance therapy in 1993. Oral LAAM typically is administered on a Monday–Wednesday–Friday schedule starting at a daily 20 mg dose with every other day increments to a maximum alternate day dosing of 130/130/180 or 100/100/140 15.

Partial agonist medications for opioid dependence

Buprenorphine and buprenorphine/naloxone tablets for the management of opiate dependence were approved by the FDA in the US.

Maintenance:it appears that decreased illicit opiate use and increased retention are seen with both higher doses of methadone (> 60 mg) and higher doses of buprenorphine (> 8mg), although methadone appears superior to buprenorphine in retaining patients when using flexible dosing approaches 30.

Detoxification: As with methadone, detoxification outcomes are likely dependent on a complex interaction of factors including dependence severity, opioid used, dose taken, duration of use, taper schedule, social/environmental circumstances, and psychological factors such as fear of withdrawal, depression, and anxiety about life without drugs 47, 48, and to date success rates have not been high.

Alpha 2 adrenergic agonist medications for opioid detoxification

Clonidine was the first alpha-2 agonist discovered to ameliorate some signs and symptoms

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of withdrawal. Because it is not a drug of abuse or dependence, clonidine has gained widespread use as a non-opioid alternative for managing withdrawal. Clonidine is typically administered orally, in three or four doses per day up to a maximum of one milligram per day.

In the United Kingdom, lofexidine has had a product license for treatment of opiate detoxification since 1992, and the extent of use has increased steadily since that time. Lofexidine treatment is typically initiated at .2 mg twice daily, increasing daily by .2–.4 mg with a recommended final dose of 2.4 mg/day.

Antagonist medications for opioid dependence

Naltrexone is an oral, long-acting, opioid antagonist with high affinity to mu-opioid receptors. A daily dose of naltrexone (50 mg) will block the pharmacologic effects of 25 mg IV heroin for as long as 24 hours, and increasing the dose extends its duration of action to 48 hours with 100 mg and 72 hours with 150 mg.

II. CONCLUSION

In conclusion, drug abuse remains a complex and multifaceted issue with far-reaching consequences for individuals, families, communities, and societies at large. It is a critical public health concern that demands comprehensive and coordinated efforts from various stakeholders including governments, healthcare professionals, educators, families, and individuals themselves.

The devastating effects of drug abuse on physical health, mental well-being, and social relationships highlight the urgency for prevention, intervention, and treatment strategies. Education and awareness campaigns play a crucial role in informing the public about the risks associated with substance abuse and promoting healthy choices.

Addressing drug abuse requires a holistic approach that encompasses not only law enforcement and punitive measures, but also emphasizes the importance of accessible and effective rehabilitation and support programs. Medical professionals should continue to explore evidence-based treatments and therapies to help individuals recover from addiction and regain control of their lives.

Ultimately, the battle against drug abuse requires empathy, understanding, and a collective commitment to creating a society where individuals are empowered to make informed decisions about their health and well-being. By working together, we can strive to reduce the prevalence of drug abuse, alleviate its impact, and create a brighter and healthier future for individuals and communities around the world.

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