



Consumers Who Abuse Both Caffeine And CNS Stimulant Drugs Encounter Withdrawal Symptoms As Well As An Impairment In Their Ability To Reason For Cognitive Behavior.

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Abstract: - Humans have always tried to increase their cognitive capacities through a variety of methods, including the usage of stimulants. Healthy people use prescription drugs like methylphenidate and modafinil as well as commonly available stimulants like caffeine to improve their cognitive function. For the treatment of sleep disorders such as narcolepsy, obstructive sleep apnea syndrome, and shift work sleep disorder, doctors routinely prescribe modafinil, a non-amphetamine stimulant. Additionally, research has shown that Modafinil improves cognitive abilities. Thus, it is increasingly being used by healthy people to increase alertness or lessen feeling fatigued. Patients receiving modafinil for the treatment of cognitive impairment who have psychiatric illnesses have also reported experiencing similar effects. According to clinical studies, modafinil reduces the symptoms of attention-deficit hyperactivity disorder (ADHD), schizophrenia, and significant depression in patients. When evaluating patients, psychiatrists hardly ever ask about coffee consumption. This could fail to recognize caffeine-related issues and provide effective remedies. A lot of psychiatric diseases share symptoms with excessive coffee consumption. People with eating problems frequently abuse caffeine, which has been linked to the aggravation of sleep and anxiety issues. It blocks adenosine receptors, which could increase dopaminergic activity and make psychosis worse. Caffeine has been reported to exacerbate psychotic, hostile, and anxious symptoms in mental patients. Before administering hypnotics, a routine mental evaluation of the patient's coffee use should be conducted. It is probably better to gradually cut back on consumption or gradually switch to caffeine-free alternatives than to stop suddenly. In psychiatric wards, decaffeinated beverages should be available.

Background: - Many different bioactive chemicals found in caffeine, which is extensively ingested in beverages including coffee, chocolate, and soft drinks, may have an impact on disease-related pathway activity. The Diagnostic and Statistical Manual of Mental Disorders (DSM-V) now includes revised guidelines for disorders associated with caffeine consumption. The diagnosis of caffeine withdrawal is now formally recognized, and criteria for caffeine use disorder have been put forth for further research. Similar to other substance use disorders, caffeine use disorder is supposed to be characterized by cognitive, behavioral, and physiological symptoms suggestive of caffeine use despite serious caffeine-related issues.

However, given the prevalence of non-problematic caffeine use, some medical professionals may find it challenging to accept the potential that caffeine consumption might lead to the same pathological behavior as alcohol, cocaine, opiates, or other drugs of abuse. When evaluating patients, psychiatrists hardly ever ask about the consumption of caffeine. This could fail to recognize caffeine-related issues and provide effective remedies. A lot of psychiatric diseases share symptoms with excessive coffee consumption. People with eating problems frequently abuse caffeine, which has been linked to the aggravation of sleep and anxiety issues. Adenosine receptors are inhibited, which could increase dopaminergic activity and aggravate psychosis. Caffeine has been observed to exacerbate psychotic, hostile, and anxious symptoms in mental IPD patients. A routine psychiatric examination of caffeine consumption drinks (coffee, soft drinks, chocolates, etc.) should be conducted before prescription hypnotics. A gradual decrease in consumption or a gradual switch to caffeine-free alternatives is likely preferable to a sudden end. There should be decaffeinated beverages available in the Psychiatry ward.

Objective: - The objective of this article is to give a thorough review and analysis of the research on human caffeine withdrawal to evaluate key aspects of the disease and empirically validate particular symptoms and indicators. To evaluate key aspects of health issues and the impact of cognitive behavior, this paper publication will present a thorough review and analysis of the literature on human consumption of caffeine withdrawal. Specific symptoms and signs will be validated through empirical research.

Methods: - A literature search revealed found several survey research articles and some clinical investigations on the consumption of caffeine or addiction withdrawal which fulfilled the inclusion criteria. A relevant article was found by searching for terms like caffeine abuse, CNS stimulants, and alcoholism on relevant search engines such as Google Scholar, and PubMed, Research Gate. The methodology of each study was assessed to ascertain the validity of the effects.

Results: - Compared to conventional psychostimulants like amphetamine, methylphenidate, or cocaine, modafinil is recognized to have fewer or no negative side effects. As an antipsychotic or anti-fatigue agent, it is usable. Modafinil's awakening process hasn't been fully uncovered, though. According to recent studies, modafinil usage and addiction are possible. Additionally, ongoing insomnia triggers stress reactions and impedes immunological performance. Therefore, a routine psychological assessment should include a caffeine intake examination. This is crucial for individuals who struggle with substance abuse, food disorders, sleep difficulties, and anxiety. The assessment of alcohol and drug usage can readily include assessment. It is fair to inquire about the usage of over-the-counter products containing caffeine in patients who abuse drugs or have eating disorders.

Conclusion: - Anyone who needs to stay awake, work late, improve cognitive reactions, or lift their mood can utilize modafinil. Users, such as cancer patients or troops in a combat zone, may already be experiencing high levels of stress. Investigating the several functions of modafinil requires a psychoneuroimmunological approach. The caffeine-withdrawal syndrome has been adequately described, and there is enough research evidence to support its inclusion as a condition in the DSM and a change to the ICD's diagnostic criteria. It would seem that caffeine is not a "pure" cognitive enhancer. Caffeine's indirect effects on arousal, mood, and focus are a major factor in how well it might enhance cognition.

Introduction: -

The most popular psychoactive substance in the world is caffeine. It is a methylxanthine that inhibits adenosine receptor activity. More than 60 species of plants are known to contain it, and foods that include it include coffee, tea, cocoa drinks, chocolate, and soft drinks. Early in the 17th century, coffee was brought to Europe after being drunk in Arabia in the 12th century. Before the birth of Christ, tea was presumably consumed in China. In the 16th century, tea was introduced to Europe.

Caffeine is rarely regarded as a hazardous substance, despite (or presumably because of) its widespread consumption. Physicians don't typically ask patients about their usage of coffee, and a psychiatric evaluation rarely questions them about it.

According to the Food Standards Agency (2001), brewed coffee typically has 100 mg of caffeine per cup, compared to 75 mg for instant coffee and 50 mg for tea, and 30 mg for a can of Coca-Cola. Since they first became accessible to the general public in 1987, sales of stimulant beverages like Red Bull (80 mg of caffeine).^[1,2]

Signs & Symptoms: -

➤ Mild to Moderate Dose (50-100mg): -

- Feeling alertness
- A mild sense of well being
- Improved motor & verbal performance

➤ Caffeine Intoxication (250 mg or more): -

It causes Anxiety, Restlessness, insomnia, sweating, diuresis, cardiac arrhythmia, and tachycardia.

➤ If the dose is more than >10g: -

Not possible with normal beverages. Done with pills.

- GTCs
- Respiratory Failure
- Death

➤ It can cause Physiological dependence: - Caffeine withdrawal includes: -

- Depressed mood, irritability, poor concentration, headache.

➤ Effects of caffeine on the Human Body: -



Fig 1: - Effects of caffeine on the Human Body.^[3]

➤ How much caffeine are you consuming: -

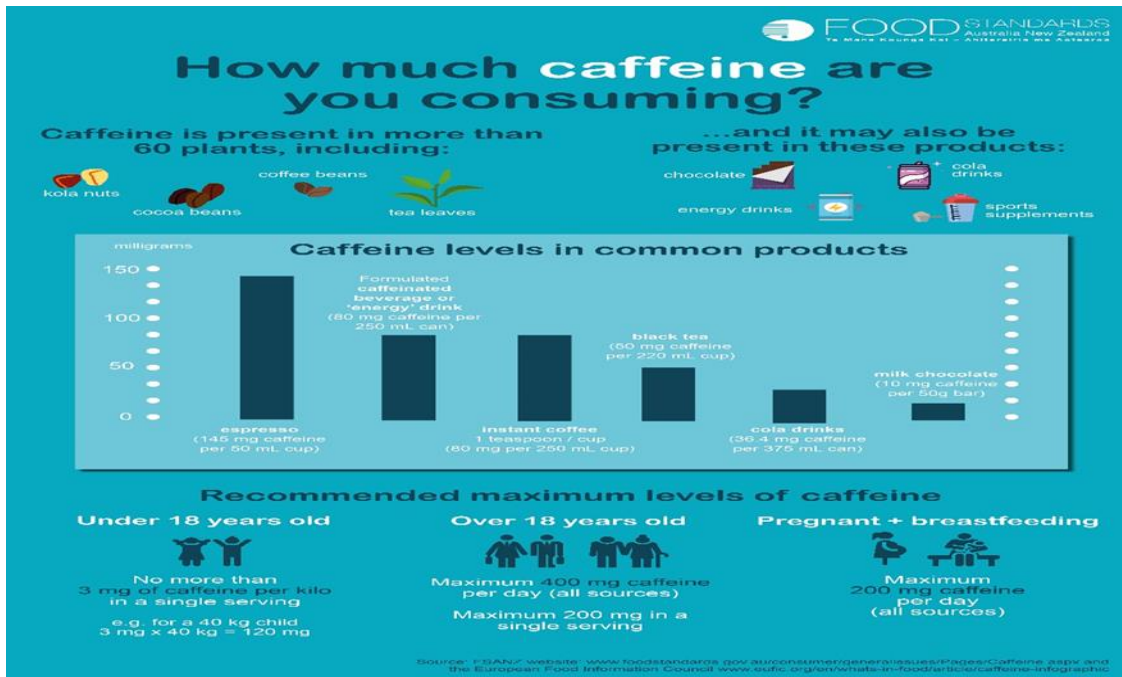


Fig 2: - How much caffeine are you consuming?^[4]

➤ Substance addictions

- Cannabis
- Nicotine
- Alcohol
- Opioids
- Stimulants
- Hallucinogens
- Empathogens
- Dissociative

➤ Progression of Stimulant Abuse: -

Progression of Stimulant Abuse

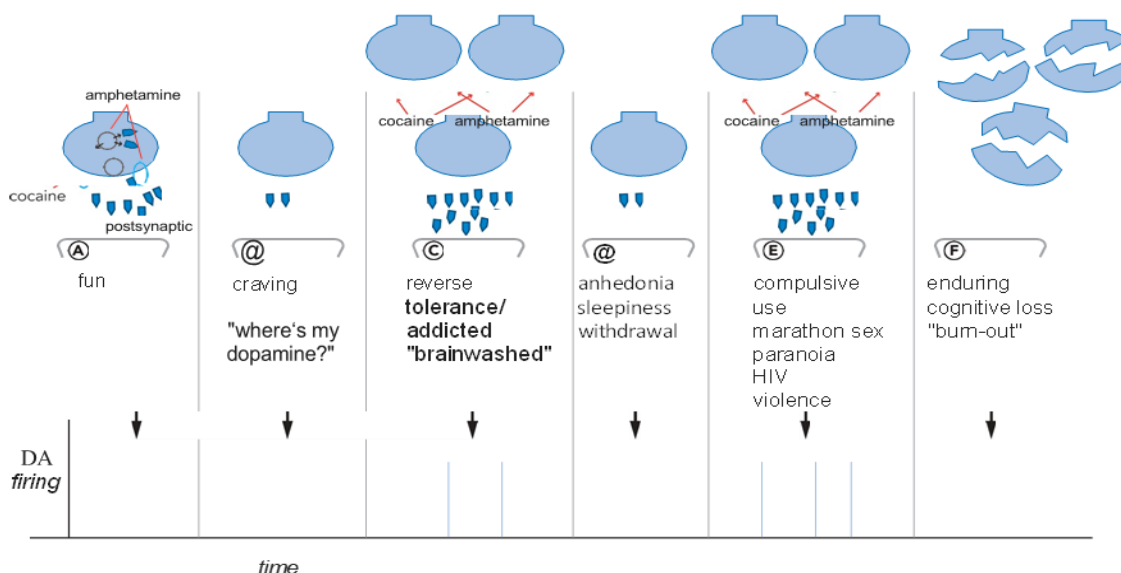


Fig 3: - Progression of Stimulant Abuse.^[5]

➤ **Tobacco: -**

- In India, it is the most prevalent substance use disorder (if caffeine is excluded).
- Nicotine is the active component that causes addiction and the associated symptoms.
- It acts in the CNS as an agonist at the nicotinic subtypes of acetylcholine receptors (α^4 β^2 , α^7 subtype which leads to the release of dopamine in rewards pathways. And this leads to pleasure arousal & subjective lessening of anxiety).
- Because nicotine is a stimulant, it enhances learning, reaction time, and problem-solving skills.

➤ **Methods of Tobacco Use: -**

○ **Smoking is one of the best methods.**

- The most prevalent method of smoking in India is beedi, followed by cigarettes.
- There are also chewing forms available.
- There are many other techniques like applying, sucking, and gargling.

○ **The following tobacco smoke components have the greatest impact on cardiovascular systems:**

- Nicotine
- Carbon Monoxide (CO)

➤ **Tobacco Withdrawal: -**

- It can appear 2 hours after the last cigarette was consumed.
- The peak is achieved in 24-48 hours
- 2-3 weeks are the maximum duration of withdrawal symptoms.

➤ **Withdrawal Symptoms of tobacco include: -**

- Intense craving for tobacco
- Irritability
- Anxiety
- Difficulty Concentrating
- Insomnia
- Bradycardia
- Increased appetite, weight gain

➤ **Treatment of tobacco consumption: -**

○ **5A's for helping Smoking cessation: -**

1. **Ask:** - Whether they are consuming tobacco.
2. **Advice:** - Firm advice to quit.
3. **Asses:** - Try to assess are willing to quit the substance.
4. **Assist:** - Assist them & help to quit.
5. **Arrange:** - Schedule follow-up contact.

➤ **Amphetamine: -**

- Such drugs as dextroamphetamine, methamphetamine, and methylphenidate are included.
- These work by releasing catecholamines like dopamine or NE, which then have their effects.

➤ **Amphetamine Intoxication: -**

- Symptoms of euphoria, papillary dilation, tachycardia, hypertension, sweating, cardiac arrhythmias, and seizures have all been reported by users (more frequently with **cocaine**).
- Similar to cocaine, psychotic disorders are one of the hallmarks of amphetamine use. It results in auditory hallucinations and paranoid delusions.

➤ Comparative Severity & Duration of Opioid Withdrawal

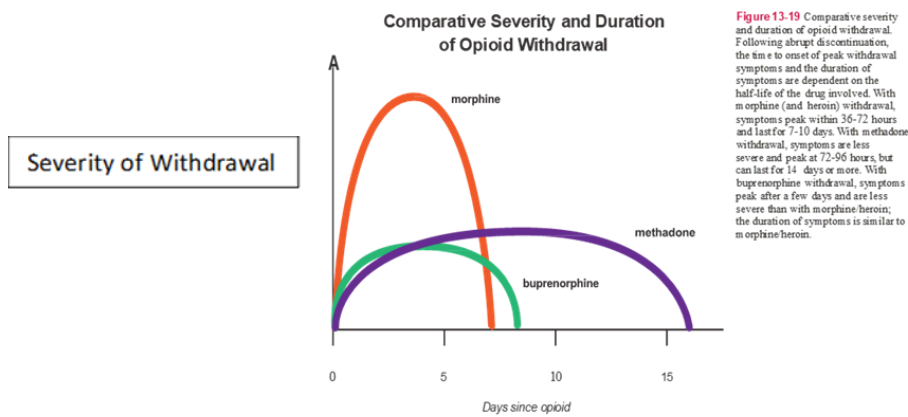


Fig 4: - Comparative Severity & Duration of Opioid Withdrawal.^[6]

➤ The Dopamine Theory of Addiction: The Mesolimbic Dopamine Circuit is the Final Common Pathway of Reward: -

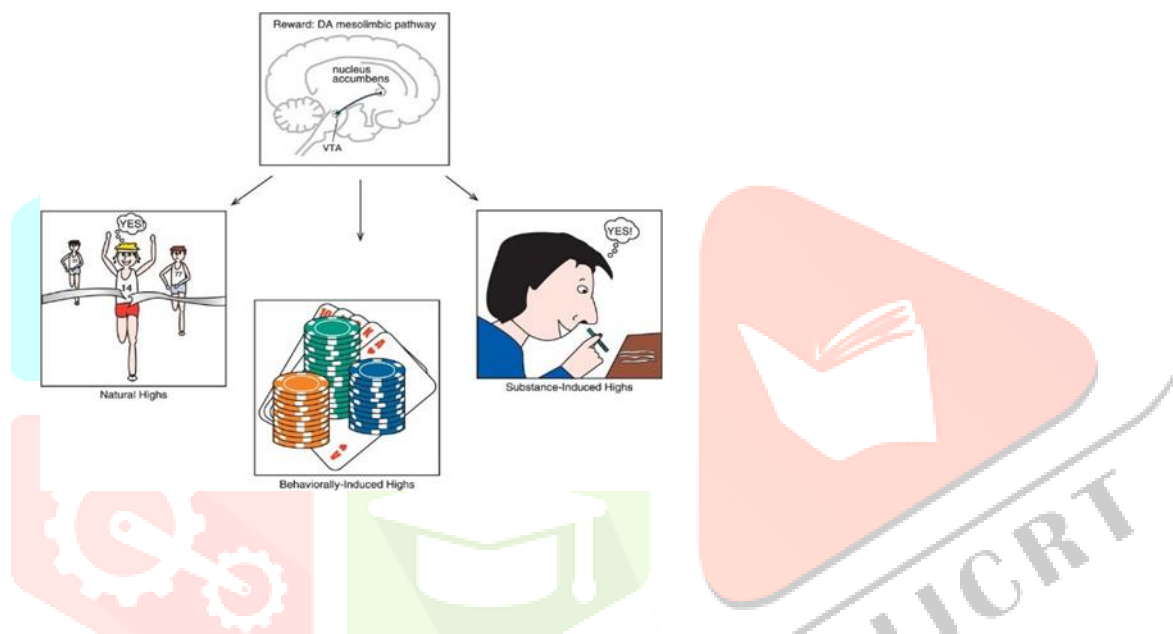


Fig 5: - Reward relies heavily on dopamine. Long recognized as a key player in the control of reinforcement and reward, dopamine (DA) plays this role. Particularly, it appears that the nucleus accumbent-ventral tegmental area (VTA) mesolimbic pathway is essential for reward. Naturally pleasant experiences, like making significant progress or enjoying a tasty meal, can quickly and significantly raise DA levels in the mesolimbic pathway. Addiction-producing drugs also trigger DA release in the mesolimbic pathway. Abuse-related medications frequently cause dopamine to rise more explosively and pleasurably than it would on its own. Contrary to a natural high, the activation brought on by drugs of abuse can eventually result in reward circuitry modifications that are connected to a drug obsession, craving, addiction, dependence, and withdrawal are a vicious circle. Many impulsive-compulsive illnesses, including pathological gambling, have similarities to this approach. In other words, those who have these diseases feel tense and aroused before engaging in the behavior and dysphoric mood (but no physiological withdrawal) when they are unable to do so. Additionally, the initial gratification and pleasure felt when engaging in the behavior seem to wane over time, possibly necessitating stronger "doses" (such as gambling larger sums of money) to attain the same results (similar to tolerance).^[7]

➤ **Alcohol Intoxication: -**

- Alcohol is a depressant of the CNS. The excitement that follows drinking is due to CNS depression, not stimulation.

➤ **Levels of Impairment at different Blood Alcohol Concentrations: -^[8]**

Levels (mg/dl)	Impairment
20-30 (30 mg/dl is legal while driving in India)	Slowed motor performance, decreased thinking ability
30-80	Increase in notes and cognitive problems
80-200	Incoordination, judgment errors, mood lability
200-300	Nystagmus, Slurring speech, Alcoholic blackouts (Anterograde Amnesia seen during intoxication)
>300	Impaired vital signs, possible death.

➤ **Blood Alcohol Concentration (BAC): -**

- It is frequently evaluated with a breath analyzer.
- Also, it can be added by a Widmark formula which depends on the amount consumed and body weight.

➤ **Alcohol Withdrawal Symptoms: -**

○ **After 6-8 hours of stopping alcohol consumption (Mild symptoms): -**

- Coarse Tremors

➤ **Other symptoms include: -**

- GI symptoms (Nausea, vomiting)
- Autonomic Hyperactivity (Anxiety arousal, sweating, mydriasis, tachycardia, hypertension)

➤ **After 8-12 hours of stopping alcohol consumption (Moderate symptoms): -**

- Alcoholic Hallucinoses (Auditory hallucinations, visual hallucinations may also be seen)

➤ **Within 12-24 hours of stopping alcohol consumption (Severe symptoms): -**

- Seizures (GTCS, Cluster seizures)

➤ **Within 72 hours of stopping alcohol consumption (Life-threatening symptoms): -**

- Delirium tremens
- Risk of delirium tremens increases further if there are some: -
 - ✓ Hepatic insufficiency
 - ✓ Pancreatitis
 - ✓ Infections
 - ✓ Heart failures
 - ✓ Renal disease

➤ **Alcohol-Induced Disorders: -**

- Alcohol-induced Psychotic Disorders
- Alcohol-induced bipolar disorders
- Alcohol-induced Depressive Disorders
- Alcohol-induced anxiety disorders
- Alcohol-induced sleep disorders
- Alcohol-induced Sexual dysfunctions
- Alcohol-induced Neurocognitive disorders

- **Alcohol-Induced Neurocognitive Disorders: -**
 - Alcohol-Induced Amnestic Disorders
 - Alcohol-Induced Dementia
 - Marchiafava Bignami Disease

- **Evaluation of Alcohol Disorders: -**
 1. **Screening Test**
 - Cage questionnaire
 - Audit
 - Michigan alcoholism screening test
 - Severity of alcohol dependence questionnaire

 2. **Laboratory Test**
 - Carbohydrate-deficient transferrin
 - Gamma-Glutamine transferase
 - Aspartate Aminotransferase & Alpine Aminotransferase
 - Mean Corpuscular Volume
 - Other tests: -
 - ✓ Uric acid
 - ✓ Alkaline Phosphate

- **Treatment of Alcohol Withdrawal: -**
 1. **Detoxification (duration of Rx: - 7-14 days)**
 2. **Maintenance: -**
 - Pharmacological treatment
 - Non-pharmacological Treatment

- **Pharmacological treatment**
 - **Deterrent Agent (Aversive Agent): - Disulfiram**
 - **Anticraving Agents: -**
 1. Acamprosate
 2. Naltrexone
 - 3. **Other Anticraving agents are (not FDA approved but effective): -**
 - Ondansetron
 - Topiramate
 - Baclofen
 - Fluoxetine

- **Non-Pharmacological Treatment**
 - a. Cognitive Behavior Therapy
 - b. Alcoholic Anonymous
 - c. Group Therapy
 - d. Family Therapy

Methods: - A literature search revealed found several survey research articles and some clinical investigations on the consumption of caffeine or addiction withdrawal which fulfilled the inclusion criteria. A relevant article was found by searching for terms like caffeine abuse, CNS stimulants, and alcoholism on relevant search engines such as Google Scholar, and PubMed, Research Gate. The methodology of each study was assessed to ascertain the validity of the effects.

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Conclusion: - Anyone who needs to stay awake, work late, improve cognitive reactions, or lift their mood can utilize modafinil. Users, such as cancer patients or troops in a combat zone, may already be experiencing high levels of stress. Investigating the several functions of modafinil requires a psychoneuroimmunological approach. The caffeine-withdrawal syndrome has been adequately described, and there is enough research evidence to support its inclusion as a condition in the DSM and a change to the ICD's diagnostic criteria. It would seem that caffeine is not a "pure" cognitive enhancer. Caffeine's indirect effects on arousal, mood, and focus are a major factor in how well it might enhance cognition. Due to the difficulty in determining the precise amount of caffeine consumed each day and the inability to predict specific effects of the triggering role that caffeine may have - even at doses considered to be "safe" - on underlying and not always known cardiovascular conditions, the dangers of caffeine are ultimately related to its wide diffusion, which results in only partially conscious high consumption.^[11]

Conflicts of Interest: - NO conflicts of interest

Authors Fundings: - No fundings

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