

## Neurodegenerative Adaptations Involved in Amphetamine Addiction

Francis Peter and Kalivas White\*

Department of Neuroscience, Finch University of Health Sciences, The Chicago Medical School, Columbia

### Introduction

Amphetamine addiction is a serious and complex health issue that affects individuals worldwide. Amphetamines are stimulant drugs that stimulate the central nervous system, increasing alertness, attention, and energy levels. While these drugs may have legitimate medical uses, such as treating attention deficit hyperactivity disorder (ADHD) and narcolepsy, they also carry a high potential for misuse and addiction [1].

The addictive nature of amphetamines lies in their ability to produce intense feelings of euphoria, increased confidence, and heightened energy. Over time, individuals may develop a tolerance, requiring higher doses to achieve the desired effects. This can lead to a vicious cycle of dependence, craving, and compulsive drug-seeking behaviour [2].

Amphetamine addiction can have profound negative consequences on various aspects of an individual's life, including physical health, mental well-being, relationships, and overall functioning. It can impact job performance, academic achievement, and personal responsibilities. Additionally, the misuse of amphetamines can lead to serious health risks, such as cardiovascular problems, psychosis, malnutrition, and overdose [3].

Recognizing the signs and symptoms of amphetamine addiction is crucial for early intervention and treatment. These may include increased drug tolerance, withdrawal symptoms when attempting to quit or cut back, inability to control or reduce drug use, neglecting personal responsibilities and relationships, engaging in risky behaviors to obtain drugs, and experiencing negative consequences as a result of drug use [4].

Treating amphetamine addiction requires a comprehensive approach that addresses both the physical and psychological aspects of the addiction. Behavioral therapies, such as cognitive-behavioral therapy (CBT), contingency management (CM), and motivational interviewing (MI), can help individuals understand the underlying factors contributing to their addiction, develop coping skills, and modify destructive patterns of thinking and behaviour [5-8].

In some cases, medication-assisted treatment (MAT) may be utilized to support recovery from amphetamine addiction. Medications such as bupropion and naltrexone may be prescribed to help manage withdrawal symptoms, reduce cravings, and stabilize individuals in recovery [9].

Recovery from amphetamine addiction is possible with the right support, treatment, and commitment to change. It is crucial for individuals struggling with amphetamine addiction to seek professional help and access appropriate treatment services. Early intervention and a comprehensive approach to treatment can greatly improve the chances of successful recovery and long-term abstinence from amphetamines [10].

### Symptoms of Amphetamine Addiction

Amphetamine addiction can manifest through a variety of

symptoms, which can be physical, behavioral, and psychological in nature. It's important to note that the presence of these symptoms alone does not definitively indicate addiction, but they can be indicators of a potential problem. Here are some common symptoms of amphetamine addiction

**Increased tolerance:** Over time, individuals may require larger doses of amphetamines to achieve the desired effects. This tolerance can be a sign of developing addiction as the body adapts to the presence of the drug.

**Withdrawal Symptoms:** When attempting to stop or reduce amphetamine use, individuals may experience withdrawal symptoms. These symptoms can include fatigue, depression, irritability, anxiety, increased appetite, and disturbed sleep patterns. Withdrawal symptoms can be a strong indicator of physical dependence and addiction [12].

**Compulsive drug seeking and use:** Individuals with amphetamine addiction often engage in compulsive drug-seeking behavior. They may spend significant time and effort obtaining the drug, neglecting personal responsibilities, and engaging in risky behaviors to sustain their habit [13].

**Failed attempts to quit or cut back:** Despite efforts to quit or reduce amphetamine use, individuals struggling with addiction may repeatedly relapse. They may express a desire to stop using but find it difficult to maintain abstinence on their own.

**Neglect of responsibilities:** Amphetamine addiction can lead to neglect of personal, professional, and academic responsibilities. Individuals may neglect work or school obligations, experience financial difficulties, or have strained relationships due to their drug use [14].

**Changes in behaviour and appearance:** Amphetamine addiction can cause noticeable changes in behavior and physical appearance. Individuals may become increasingly agitated, irritable, or paranoid. They may experience weight loss, poor hygiene, and neglect their overall physical appearance.

**Social isolation:** Addiction can lead to social isolation as individuals may withdraw from friends, family, and previously enjoyed activities. They may prioritize drug use over maintaining relationships and participating in social engagements [15].

**Mood and psychological changes:** Amphetamine addiction can

\*Corresponding author: Kalivas White, Department of Neuroscience, Finch University of Health Sciences, The Chicago Medical School, Columbia, E-mail: whitekalivas@gmail.com

Received: 05-May-2023, Manuscript No: jart-23-100078; Editor assigned: 08-May-2023, PreQC No. jart-23-100078 (PQ); Reviewed: 22-May-2023, QC No. jart-23-100078; Revised: 24-May-2023, Manuscript No. jart-23-100078 (R); Published: 31-May-2023, DOI: 10.4172/2155-6105.100536

Citation: Peter F, White K (2023) Neurodegenerative Adaptations Involved in Amphetamine Addiction. J Addict Res Ther 14: 536.

Copyright: © 2023 Peter F, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

affect an individual's mood and overall psychological well-being. They may experience mood swings, irritability, restlessness, anxiety, and even symptoms of psychosis, such as hallucinations or delusions.

**Risky behaviors:** Individuals struggling with amphetamine addiction may engage in risky behaviors to obtain drugs or support their habit. This can include stealing, driving under the influence, or engaging in unsafe sexual practices [16].

**Health issues:** Prolonged amphetamine use can lead to various physical health problems, including cardiovascular issues, malnutrition, dental problems, and sleep disturbances (Figure 1).

It is important to note that the severity and combination of symptoms can vary among individuals. If you or someone you know is experiencing several of these symptoms and suspect amphetamine addiction, it is crucial to seek professional help and support from healthcare providers or addiction specialists. They can provide a comprehensive assessment and guide you toward appropriate treatment options [17].

### Types of Amphetamine Addiction

Amphetamine addiction can involve different types of amphetamines, which can vary in their chemical composition, method of administration, and legal status. Here are some types of amphetamine addiction:

**Prescription Amphetamine Addiction:** Prescription amphetamines, such as Adderall and Dexedrine, are commonly prescribed for medical conditions like attention deficit hyperactivity disorder (ADHD) and narcolepsy. However, misuse or abuse of these medications can lead to addiction. Individuals may take higher doses than prescribed, use them without a prescription, or use them for non-medical purposes to experience the stimulant effects.

**Methamphetamine addiction:** Methamphetamine, commonly known as meth, is a highly potent and addictive stimulant. It is typically produced illegally in clandestine laboratories. Methamphetamine can be smoked, snorted, injected, or swallowed. Methamphetamine addiction is a serious concern due to its potent effects on the central nervous system and the significant health risks associated with its use [18].

**Illicit amphetamine addiction:** Illicit amphetamines refer to amphetamine-based substances produced and distributed illegally. These include drugs like ecstasy (MDMA) and "speed." Ecstasy is often consumed in tablet form and is known for its stimulant and hallucinogenic effects. Speed, on the other hand, usually comes in



Figure 1: Amphetamine medicine.

powdered or pill form and is used for its stimulant properties. Illicit amphetamines can be associated with a range of risks, including addiction, unpredictable effects, and potential adulteration with other harmful substances [19].

**Designer amphetamine addiction:** Designer amphetamines, also known as "research chemicals" or "legal highs," are synthetic substances designed to mimic the effects of amphetamines. These substances are created to circumvent legal restrictions by altering the chemical structure while still producing similar stimulant effects. However, their safety and long-term effects are often unknown, and they can pose significant risks to users, including addiction [20].

**Combination substance abuse:** Amphetamines may also be combined with other substances, such as alcohol or other drugs, leading to polydrug abuse. Mixing amphetamines with other substances can intensify their effects or create unique risks and complications. This type of addiction may involve a combination of amphetamines and other drugs, such as opioids, cocaine, or benzodiazepines [21].

### Precautions to be taken to avoid the Amphetamine Addiction

To help prevent amphetamine addiction or reduce the risk of developing dependency on these substances, it is important to take certain precautions. Here are some precautions that can be taken:

**Use prescription medications as directed:** If you have been prescribed amphetamines for a legitimate medical condition, it is essential to follow the prescribed dosage and instructions provided by your healthcare professional. Avoid taking higher doses or using the medication more frequently than recommended.

**Educate Yourself:** Learn about the potential risks and side effects associated with amphetamines. Understanding the potential dangers and consequences of misuse or abuse can help you make informed decisions about their use [22].

**Avoid non-medical use:** Amphetamines should only be used for legitimate medical purposes as prescribed by a healthcare professional. Avoid using these substances recreationally or without a valid prescription.

**Responsible Use:** If you are using amphetamines as prescribed, it is important to use them responsibly. Follow the recommended dosage and timing, and avoid taking them for longer durations than necessary. Communicate any concerns or side effects to your healthcare provider.

**Open communication with healthcare providers:** Maintain open and honest communication with your healthcare provider regarding your medication use. Discuss any concerns, changes in symptoms, or difficulties you may be experiencing. Your healthcare provider can provide guidance and monitor your medication usage appropriately.

**Be mindful of tolerance and dependency:** Amphetamines can lead to tolerance and dependency with prolonged use. Be mindful of changes in your response to the medication and discuss any concerns with your healthcare provider. They can assess whether adjustments to your treatment plan are necessary [23].

**Avoid Mixing Substances:** Do not combine amphetamines with other substances, including alcohol or illicit drugs. Combining substances can increase the risks of adverse effects, health complications, and addiction.

**Seek non-drug alternatives:** In certain cases, non-drug alternatives may be available for managing conditions like ADHD or narcolepsy. Explore alternative treatment options with your healthcare provider,

such as behavioral therapies, lifestyle modifications, or other medications that may have a lower risk of addiction.

**Regular check-ins:** Schedule regular follow-up appointments with your healthcare provider to monitor your progress, evaluate the effectiveness of the treatment, and address any concerns or questions.

**Seek professional help for addiction:** If you or someone you know is struggling with amphetamine misuse or addiction, seek professional help from healthcare providers or addiction specialists. They can provide appropriate assessment, guidance, and treatment options tailored to your specific needs.

Remember, these precautions can help reduce the risk of amphetamine addiction, but they do not guarantee complete prevention. If you have concerns about your use of amphetamines or suspect addiction, it is crucial to seek professional help and support.

## Conclusion

In conclusion, amphetamine addiction is a significant and complex problem that can have profound impacts on individuals' lives. Whether it involves prescription amphetamines, methamphetamine, illicit amphetamines, or designer amphetamines, addiction to these substances can result in physical, psychological, and social consequences.

Amphetamine addiction is characterized by increased tolerance, withdrawal symptoms, compulsive drug-seeking behavior, and failed attempts to quit or cut back on drug use. It can lead to neglect of responsibilities, changes in behavior and appearance, social isolation, and a range of health issues. Recognizing the signs and symptoms of amphetamine addiction is crucial for early intervention and seeking appropriate treatment.

Precautions can be taken to reduce the risk of amphetamine addiction, such as using prescription medications as directed, educating oneself about the risks, avoiding non-medical use, and maintaining open communication with healthcare providers. Responsible use, mindful monitoring of tolerance and dependency, and avoiding the mixing of substances are also important precautions to consider.

When addiction to amphetamines occurs, professional help and support are necessary. Treatment approaches may involve a combination of behavioral therapies, medication-assisted treatment, counselling, and support from healthcare professionals or addiction specialists. The journey to recovery from amphetamine addiction requires commitment, support, and on-going efforts to address the underlying factors contributing to the addiction.

It is important to remember that recovery from amphetamine addiction is possible. With the right support, treatment, and a commitment to change, individuals can regain control of their lives, overcome addiction, and work towards a healthier and drug-free future.

## References

- Adewuya AO (2006) Prevalence of major depressive disorder in Nigerian college students with alcohol-related problems. *Gen Hosp Psychiatry* 28:169-173.
- Hasin DS, Grant BF (2002) Major depression in 6050 former drinkers: association with past alcohol dependence. *Arch Gen Psychiatry* 59: 794-800.
- Graham K, Massak A, Demers A, Rehm J (2007) Does the association between alcohol consumption and depression depend on how they are measured?. *Alcohol Clin Exp Res* 31: 78-88.
- Okonoda KM, Audu MD, Obindo TJ, James BO (2014) Prevalence of alcohol use disorders among medical and surgical in-patients at a Teaching Hospital in North Central Nigeria. *Jos J Med* 8: 22-28.
- Compton WM, Thomas YF, Stinson FS, Grant BF (2007) Prevalence, correlates, disability, and comorbidity of DSM-IV drug abuse and dependence in the United States: results from the national epidemiologic survey on alcohol and related conditions. *Arch Gen Psychiatry* 64: 566-576.
- Hillas G, Perlikos F, Tsiligianni I, Tzanakis N (2015) Managing comorbidities in COPD. *Int J Chron Obstruct Pulmon Dis* 10:95.
- Pedrelli P, Nyer M, Yeung A, Zulauf C, Wilens T (2015) College students: mental health problems and treatment considerations. *Acad Psychiatry* 39: 503-511.
- Grant BF, Goldstein RB, Saha TD, Chou SP, Jung J, Zhang H, et al. (2015) Epidemiology of DSM-5 alcohol use disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions III. *JAMA Psychiat* 72: 757-766.
- Auerbach RP, Alonso J, Axinn WG, Cuijpers P, Ebert DD, et al. (2016) Mental disorders among college students in the World Health Organization world mental health surveys. *Psychol Med* 46: 2955-2970.
- Bingham CR, Shope JT, Tang X (2005) Drinking behavior from high school to young adulthood: differences by college education. *Alcohol Clin Exp Res* 29: 2170-2180.
- Hingson RW, Heeren T, Winter MR (2006) Age at drinking onset and alcohol dependence: age at onset, duration, and severity. *Arch Pediatr Adolesc Med* 160: 739-746.
- Li D, Yang X, Ge Z, Hao Y, Wang Q, et al. (2012) Cigarette smoking and risk of completed suicide: a meta-analysis of prospective cohort studies. *J Psychiatr Res* 46:1257-1266.
- Chukwujekwu CD (2017) Addiction Research & Therapy. *Niger Med J* 55: 460-464.
- Ademola A, Boima V, Odusola A, Agyekum F, Nwafor C, et al. (2019) Prevalence and determinants of depression among patients with hypertension: A cross-sectional comparison study in Ghana and Nigeria. *Niger J Clin Pract* 22: 558-568.
- Organization WH (2001) AUDIT: The alcohol use disorders identification test: Guidelines for use in primary health care. World Health Organization, USA.
- Ugochukwu OC, Donald CC, Chukwuemeka SP (2016) Comorbidity of alcohol use disorder and depression among patients attending a tertiary hospital in the Niger Delta region of Nigeria. *Neuroscience* 4: 38-42.
- Adewuya AO (2005) Validation of the alcohol use disorders identification test (audit) as a screening tool for alcohol-related problems among Nigerian university students. *Alcohol Alcohol* 40: 575-577.
- Leonardson GR, Ness FK, Daniels MC, Kemper E, Koplin BA, et al. (2005) Validity and reliability of the audit and CAGE-AID in Northern Plains American Indians. *Psychol Rep* 97:161-166.
- Lowe B, Unutzer J, Callahan CM, Perkins AJ, Kroenke K (2004) Monitoring depression treatment outcomes with the patient health questionnaire-9. *Med Care* 1: 1194-1201.
- Cameron IM, Crawford JR, Lawton K, Reid IC (2008) Psychometric comparison of PHQ-9 and HADS for measuring depression severity in primary care. *Br J Gen Pract* 58: 32-36.
- Kroenke K, Spitzer RL, Williams JB (2001) The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med* 16: 606-613.
- Hingson RW, Zha W, Weitzman ER (2009) Magnitude of and trends in alcohol-related mortality and morbidity among US college students ages 18-24, 1998-2005. *J Stud Alcohol Drugs Suppl* 16:12-20.
- WHO report (2017) Depression and Other Common Mental Disorders: Global Health Estimates. *Am Psychol Assoc* 1:1-24.