

Methamphetamine Addiction

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ABSTRACT

Objectives: A person can develop an addiction to many kinds of substances. Methamphetamine is the second most widely abused drug worldwide. Long-term methamphetamine usage may cause social, psychological, and physical problems. Long-term effects (such as weight loss, memory loss, tremors, convulsion, psychosis, paranoia, hallucinations, Parkinson's-like symptoms, and cardiovascular collapse) and short-term effects (such as euphoria, dilated pupils, insomnia, reduced appetite, increased blood pressure) are listed and, brain damage and mental problems due to methamphetamine abuse are briefly mentioned in this text. The severity of withdrawal symptoms varies from person to person. Unfortunately, there is no exact cure for methamphetamine abuse. This is not a systematic review.

Keywords: methamphetamine, addiction, brain damage, meth mouth.

Addiction is a chronic dysfunction of brain. It can also be classified as biologic, psychological and social disease. It makes the addict seek for the substance despite of its damages. People can develop an addiction to alcohol, tobacco, hallucinogens (such as LSD), heroin, painkillers, sedatives, hypnotics and tranquilizers, cocaine, methamphetamine and other stimulants. ¹ Some symptoms of addiction can be listed as; having a strong need for the substance, starting not to fulfill his/her responsibilities due to using the related substance, continuing to use despite negative consequences, unsuccessful trials to quit, living physical, psychological, social and economic problems due to using the substance, having developed tolerance against the substance, living withdrawal symptoms (nausea, insomnia, anxiety, aggressiveness, diarrhea, shivering, fever, etc.) when not used the substance.

Abuse of the illegal psychostimulant, methamphetamine, which was first synthesized in

1919 as a synthetic substitute for ephedrine has become a worldwide health problem. ² It is estimated that there are approximately 35 million users; a number which exceeds the total amount of people who are addicted to heroin and cocaine. This makes methamphetamine the second most abused drug; the first widely abused drug is cannabis. ³

Clinical Effects

Though methamphetamine (as well as amphetamine) is a central nervous system stimulant to treat some diseases such as attention deficit hyperactivity disorder, obesity and narcolepsy, it is also one the addictive's which has a large potential for abuse with long-lasting brain damage and many other problems. ⁴

Methamphetamine (commonly known as speed, meth, ice, crystal, or chalk) can be taken by smoking, swallowing, snorting, and injecting a dissolved

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powder. It causes a general sense of high mood and well-being. It starts working very fast and its effects can last six to ten hours.^{5,6}

Using methamphetamines have some short-term and long-term effects. Some short-term effects can be listed as enhanced mood and body movement, euphoria, dilated pupils, increased wakefulness, insomnia, reduced appetite, increased blood pressure, rapid and/or irregular heartbeat, hyperthermia, neuropsychiatric symptoms (like anxiety, psychosis, and hallucinations) and cardiovascular collapse. Long-term effects can be listed as changes in brain structure and function (methamphetamine stimulates some neurotransmitters like dopamine, norepinephrine, and serotonin), weight loss, memory loss, tremors, convulsion, psychosis, paranoia, hallucinations, Parkinson's-like symptoms, cardiovascular collapse, which may cause death. In some cases, psychotic symptoms can last for months or years even after the addict stops using methamphetamine.⁷⁻¹¹

A meta-analysis of the neuropsychological effects of methamphetamine abuse revealed medium size effect; resulting in deficits in episodic memory, executive functions, information processing speed, motor skills, language, and visuoconstructional abilities.¹²

A study was made in Harbor UCLA Medical Center by Dr. Thomas Ernst and Dr. Linda Chang using magnetic resonance spectroscopy. They intended to measure brain chemical levels and aimed to reveal whether the brain cells of methamphetamine abusers were healthy or not. After the study, Dr. Chang clarified that they discovered strong cell damage and abnormal brain chemistry in all brain regions of participants.¹³

Studies made by structural magnetic resonance imaging, single photon emission computed tomography, and proton magnetic resonance spectroscopy have revealed that chronic use of methamphetamine produces malign effects. Positron emission tomography has revealed that (compared with measures of control group participants) methamphetamine addicts have lower levels of dopamine transporters in the striatum and prefrontal cortex and show differences in regional cerebral glucose metabolism.¹⁴⁻²³

Another unpleasant and also one of the most visible consequence effects that is associated with methamphetamine abuse is extreme tooth decay; called meth mouth. Researchers argue that relevant tooth decay is due to methamphetamine's restriction of salivary flow, which leads to xerostomia (dry mouth). Because xerostomia can increase the likelihood of plaque and dental caries (tooth decay), this condition

might underlie the attention-grabbing pictures of meth mouth seen in social media.^{24,25}

Withdrawal Effects

Dysphoric mood is the main symptom of methamphetamine withdrawal, with psychomotor agitation or retardation, vivid, unpleasant dreams, fatigue, insomnia, or in some cases hypersomnia.^{26,27} Depressive symptoms vary in intensity and duration.²⁸ Some of the less severe withdrawal symptoms are anxiety, motor retardation, agitation, vivid dreams, poor concentration, irritability, and tension decrease at 7-10 days.²⁹⁻³² The severity of methamphetamine withdrawal symptomatology is likely to influence the ability of methamphetamine addiction patients to maintain abstinence.²⁸

Treatment

Because addicts have a high percentage of dropout and relapse, methamphetamine addiction treatment is troublesome. Addicts' facing with severe psychosis episodes and craving makes the process even harder.^{33,34} There are no specific medicines that can help addict that prolong abstinence from the substance. But there are some medications which are approved by FDA for other side effects and diseases that might be useful in treating methamphetamine addiction. The best plans are comprehensive, which include medications, psychotherapy (including behavioral therapy, family therapy and group therapy) and medical services (to help treat serious complications of addiction like withdrawal during detox period).^{8-10, 35, 36} Research also continues in order to developed medicines and other kinds of treatments for methamphetamine abuse, including vaccines and noninvasive stimulation of the brain by using magnetic fields.³⁷

CONCLUSION

Methamphetamine abuse is one of widest substance addiction type worldwide. Because of the reason that it is cheap, it is easy to reach. It has detrimental effects in human body, which are proved by technological health devices. There is no medication which can cure methamphetamine addiction. It is important to go on studies to set aside related harmful effects of methamphetamine abuse.

Authors' Contribution

Study Conception: Bİ.; Study Design: Bİ.;

Supervision: ÖG,; Materials: ÖG,; Data Collection and/or Processing: Bİ,; Statistical Analysis and/or Data Interpretation: Bİ,; Literature Review: ÖG,; Manuscript Preparation: Bİ, ÖG and Critical Review: ÖG.

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