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Harmful Adulterants in Seized Amphetamine Tablets in Iraq: Profiling and Health Risks

Duaa Ahmed Akhmais^{AB}, Noor Sabah², Zainab Khalid Ali³, Zainab Karim Jaffar⁴(A) Department of Pharmacy, Faculty of Pharmacy, The University of Mashreq, Baghdad 10023, Iraq . Duaa.a.akhmais@uom.edu.iq(B) Medico-Legal Institute, Ministry of Health Baghdad / Iraq. duaaahmed91109@gmail.com2) Assistant lecturer Al-Farahidi university. noor.hameed@uofarahidi.edu.iq3. Department of Pharmacy, Al-Hikma University College, Baghdad, Iraq . zainab.ali@hiuc.edu.iq4).Medico-Legal Institute, Ministry of Health Baghdad / Iraq. Zainsaf70@gmail.com

Abstract

Background: Amphetamine type stimulants (ATS) refers to a class of drugs that are primarily synthetic and that stimulate the central nervous system. When overdosed or abused over an extended period of time can lead to psychotic toxicity, reduce fatigue, and increase wakefulness and activity levels, has been adulterated with various substances in illicit markets. Adulterants that raise the possibility of harm include caffeine, lidocaine, diphenhydramine, quinin and others, these substances are likely used to enhance the stimulant effects, reduce cardiovascular side effects, or mitigate symptoms like insomnia. However, the presence of these additives heightens the risk of toxicity and adverse health effects. These findings underscore the significant health risks posed by adulterants in amphetamine tablets, calling for stronger measures to prevent illegal distribution and increase public awareness.

Objectives: This study investigates amphetamine tablets seized in Iraq to identify the presence of these adulterants and assess their harmful impact. It also intends to increase public awareness of the health dangers associated with drug adulterants.

Method: Amphetamine tablets were secretly gathered from various seizures to protect privacy and safety in the forensic medicine department. The tablets were then examined using GC-MS to detect the presence of adulterants and amphetamine.

Expected outcomes: A statistical study will be conducted to determine the prevalence of different adulterants, identify frequent adulterants recognized with amphetamine, and examine the health concerns associated with these adulterants.

Conclusion: An addiction on amphetamine can result in serious medical risks such as heart problems, psychological disorders like anxiety and cognitive impairment, adulterated amphetamine which increases the risk of unpredictable, toxic reactions, making it even more dangerous so reducing or stopping use ensure access to treatment are crucial to prevent health damage.

Keywords: adulteration; illicit; drugs of abuse; seized drugs; seizures.

1. Introduction

Amphetamine-type stimulants (ATS) are among the most commonly seized illicit substances in Iraq. Overdose and toxicity from ATS can have serious consequences, including increased rates of morbidity and mortality⁽¹⁾. can result in tachycardia, hypertension, sensations of heightened energy, social ability, and self-assurance, as well as sleep deprivation. When taken orally, the effects often manifest within thirty minutes and last for several hours. Users may experience irritability, restlessness, anxiety, depression, and lethargy later on⁽²⁾. Use of ATS is related with a number of health and societal concerns, and has been expanding

worldwide in the last decade. Harming oneself and ATS use are more common in excluded populations with high rates of trauma exposure and have several underlying risk factors. Individuals who take amphetamines on a long-term basis run the risk of heart disease, embolic ischemic attacks, and pulmonary arterial hypertension. Furthermore, people who use amphetamines chronically frequently have widespread skin lesions, poor oral hygiene, and low nutritional status. Skin lesions are often caused by parasitosis delusions ⁽³⁾. Amphetamines enter neurons through the 5-HT and DA transporters and displace storage vesicles to boost the neurotransmission of dopamine (DA), serotonin (5-HT), and norepinephrine (NE) ⁽⁴⁾. Amphetamine that modulates monoamine neurotransmission through the regulation of the trace amine-associated receptor 1 (TAAR1) and inhibiting the vesicular monoamine transporter 2 (VMAT2). The central nervous system (CNS) contains several sites where TAAR1 is expressed, and numerous of these regions are crucial for the emergence of addiction. Consequently, the desire to take amphetamines more is produced by their use ⁽⁵⁾. Receptor activation can have downstream effects that include changes in intracellular calcium, mitochondrial malfunction, and an increase in reactive oxygen species. The rapid onset of cardiovascular disease has been linked to these metabolic abnormalities ⁽⁶⁾. On the Internet, production techniques for these goods are easily found ⁽⁷⁾. This causes numerous highly contaminated populations to distribute such designer medications widely (illegally). ATS, unlike a lot of illegal substances, is seldom consumed or sold in its purest form. While this combination is not authorized by medicine, drug dealers frequently use it to raise the apparent amount of the drug while also amplifying the harmful effects of amphetamine above its inherent risks. These are also strongly mixed with a variety of additives, adulterants, as well as diluents to try to maximize the dealer's profit. Understanding which potentially dangerous ingredients taint illegal medications is crucial ⁽⁸⁾. as they might be harmful, particularly as amphetamine was haphazardly added to pills regardless of their weight. Caffeine has less potent pharmacological effects than other potent psychostimulants (like amphetamines), but when put together, the effects of the two substances intensify, stimulating the central nervous system more. Caffeine and amphetamine the both stimulate the cardiovascular system, raising blood pressure and heart rate and causing dangerous side effects like tremors, anxiety, heart palpitations, and insomnia ⁽⁹⁾. Moreover, we discovered that theophylline's and amphetamine's synergistic stimulant actions

accelerate and greatly increase the potency of amphetamine's psychoactive effects, seriously impairing mental as well as physical well-being⁽¹⁰⁾. Combining sildenafil (brand name Viagra) with amphetamine can result in dangerous and significant side effects, including as heart difficulties. This is because sildenafil lowers blood pressure by relaxing blood vessels, while amphetamine increases heart rate and blood pressure. When these two drugs are used together, the body may send contradictory signals.⁽¹¹⁾ Additionally, long-term use of amphetamine can result in erectile dysfunction. Some individuals try to counteract the sexual adverse effects of amphetamine by using sildenafil, which can lead to severe consequences such as arrhythmias and unstable blood pressure⁽¹²⁾. While some adulterants, such as paracetamol, are inexpensive and widely available, they do not function as synergistic agents when mixed and simply work as bulk-forming drugs. This combination can cause liver failure in the event of an overdose⁽¹³⁾. Additionally, in certain instances, we discovered Quinine combined with amphetamine, which may alter the latter's metabolism and possibly enhance its concentration. Quinine can also cause a minor numbing sensation on mucous membranes, deceiving users into believing they are taking a more potent drug. While these combinations take place without medical supervision, there is a significant risk for users due to the purity and dose of the precursor, which increases the risk of side effects like cardiovascular disease and seizures, Hearing loss⁽¹⁴⁾ Additionally, quinine's powerful bitter flavor makes amphetamine taste like a purer substance⁽¹⁵⁾. In order to counteract some of the adverse effects of amphetamine, such as anxiety and insomnia, diphenhydramine was added. However, this combination ultimately made the more serious side effects, such as elevated heart rate, dehydration, and cognitive decline, worse⁽¹⁶⁾ Also lidocaine was inserted into some amphetamine tablets that are not advised or prescribed solely because lidocaine is a local anesthetic and produces a numbing effect; users may confuse this numbness for an indication of high-quality amphetamine. This combination is dangerous because of the unpredictable dosage, which increases the risk of cardiovascular problems⁽¹⁷⁾. Dextromethorphan is occasionally added by dealers to amphetamine tablets, which carries some risk because both can exacerbate serotonin syndrome and lead to overstimulation, which can result in potentially severe conditions (rapid heart rate, agitation, sweating, and muscle rigidity)⁽¹⁸⁾. Additionally, we discover that amphetamine and tramadol tablets are adulterated, these substances raise serotonin levels when taken combined, causing agitation, convulsions, lack of coordination,

and elevated fever. Confusion, disorientation, and cardiovascular stress are caused by the combination of amphetamine's stimulant properties and tramadol's opioid sedative properties ⁽¹⁹⁾ A comparable increase in the amount of amphetamine found in the tablets under test indicates the potential for toxicity, as this dosage of amphetamine can result in many adverse effects, including dependence. Massive amounts of amphetamine cause impairment of cognitive functions and aggravation of nerve damage coupled with the induction of fast muscular breakdown. The study's goal was to use gas chromatography/mass spectrometry (GC/MS) to profile amphetamines in samples that were taken from the Iraqi market. Users and government authorities should be made aware of the harmful ingredients in these tablets so that they can take proactive steps to stop the illegal trafficking and use of these drugs. It is essential to identify these potentially hazardous substances that contaminate amphetamine because they may even be more harmful than the original amphetamine itself.

2. Materials and methods

Thirty samples were obtained for this investigation from the Ministry of Health's Iraqi Medico-Legal Directorate for Narcotics Control. Each of the thirty samples had its weight, type, and color along with the amphetamine indication noted. and crushed by a mortar. One pill served as the sample, which was dissolved in two milliliters of methanol and vortexed for two minutes. After that, it was subjected to an ultrasonic equipment for 45 minutes to make sure all of the dissolved substance's constituents were completely dissolved. After adding methanol to the solution to the whole amount, it was centrifuged for two minutes at 4000 rpm to separate the clearance, which was then transferred into disposable culture tubes Following sample separation, 1.9 ml of methanol was added, and 100 µl of the clearing solution was placed into a 2-milliliter vial before being injected into the injection tube of the GC MS.

3-Results and discussion

Similar to pharmaceutical tablets, amphetamine tablets are produced as a single dosage. Extensive physical and chemical research of amphetamine tablets yielded findings that may be useful in identifying its distinguishing characteristics and identifying its origin. Among the thirty tablets analyzed, various varieties of amphetamine tablets that were seized by various locations were discovered. The

extracted data demonstrated the variations in amphetamine concentrations between the adulterants and diluents in the examined amphetamine tablets. An average of 100% amphetamine prevalence was found in 30 of the adulterated tablets, which also contained caffeine, lidocaine, diphenhydramine, sildenafil, methamphetamine, theophylline, acetaminophen, quinine, tramadol, Forensic samples containing suspected drug residue are typically identified using mass spectrometry. The retrieved mass spectra showed that various chemicals were adulterating the amphetamine pills that were found in Iraq. Additionally, the outcomes of the adulterant and diluent concentration provides a comprehensive understanding of the origins of these pills, their toxicity, and the gravity of their components' effects on users' health as evidenced It was easy to discriminate between the substances under investigation using their MS spectra because they belonged to various chemical identities. Since all of the primary fragment ions in this group of compounds occur at distinct masses, the MS of these compounds offers structural information for distinguishing between them. Table 1 provided a list of the most frequent adulterant chemicals identified by GC-MS. The GC-MS technique that was used was based on the references ^(20,21). The results were compared to selective ion monitoring (SIM) and complete mass spectra for each chemical using a library that has spectra for many common compounds.

4- Conclusion

Amphetamine was identified as the main ingredient in the pill samples after examination. Caffeine, lidocaine, diphenhydramine, and theophylline were among the other psychoactive and non-psychoactive drugs found; these were probably added by covert labs to enhance the effects of amphetamine and increase reliance. The toxicity of these pills is greatly increased by the inclusion of these additives as well as additional chemicals and medicinal components. To assist stop the illicit trafficking and use of these tablets, it is essential to educate users and government officials about these dangerous ingredients. Amphetamine was identified as the main ingredient in the pill samples after examination. Caffeine, lidocaine, diphenhydramine, and theophylline were among the other psychoactive and non-psychoactive drugs found; these were probably added by covert labs to enhance the effects of amphetamine and increase reliance. The existence of these

Table 1. Components found with amphetamine tablet seized in Iraq

Amphetamine

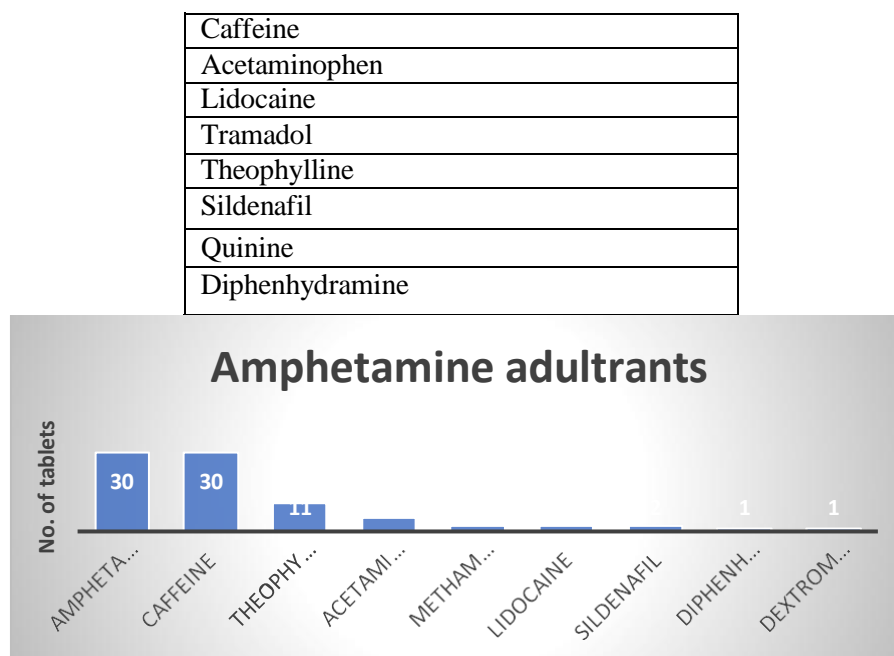


Figure (1): Components found with amphetamine tablet seized in Iraq

5- Dedication

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