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# Methamphetamine Manufactured from Pseudoephedrine; Both as Double-Edged Swords

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Methamphetamine, or meth, is a potent stimulant that is prescribed for psychiatric conditions such as attention deficit hyperactivity disorder (ADHD) and weight issues. Contrariwise, this agent is more used recreationally for energy boosting and feelings of strength it creates. Pseudoephedrine (PSE) is the key ingredient used to produce methamphetamine. Pseudoephedrine has one less hydroxyl group compared to another commonly used sympathomimetic in cold and allergy products which results in a more lipid soluble molecule and thus more central nervous system (CNS) availability (1).

Methamphetamine has many other names such as “Meth”, “Crystal”, “Speed”, “Crank”, “Chalk”, “Wash”, “Trash”, “Pookie” (2), “Shisheh” or “Glass” (in Iran), is considered the second most abused illicit drug. Considerable struggles have been made to lower the supply and demand for recreational drugs. Methamphetamine is of specific importance because of its popularity and crimes outcomes (3).

Methamphetamine produces several cardiovascular side effects. This drug is man-made which produces euphoria through an unknown mechanism. It causes great quantities of dopamine release possibly due to toxic effects on nerve terminals in the brain. Dopamine release results in pleasurable feeling and thus reinforces the brain to take the drug more frequently. Dopamine release is rewarding and associated with motivation and motor function related to addiction (4,5).

“Meth cooks” is performed through local methamphetamine manufacture in small labs by using over-the-counter (OTC) medications containing pseudoephedrine (6,7). In 2005, USA Congress passed an Act to tackle the criminal diversion of pseudoephedrine to meth. The regulation was effective from September 2006 (8). So, by law the following were required:

All pseudoephedrine containing OTC medicines should be sold from behind a sales counter and limits of 3.6 grams per day or 9 grams per 30 days. The medicine is only sold to patient who presents a formal identification card and provide personal information which will be kept in the pharmacy for 2 years.

Meth lab numbers dropped by more than 65% in 2007 following this law. Sadly, meth lab events remained high or even went up due to a new method of meth manufacturing branded as the “one-pot” or “shake-and-bake” in which smaller amounts of meth in more frequent sets are produced. Another likely reason is “smurfing” which means hiring individuals to purchase pseudoephedrine from various stores (9). Also, there are reports about the import of pseudoephedrine from Mexico to the USA, according to Forbes (10).

Methamphetamine is smuggled into countries like USA in the form of powder or liquid. Local, and small conversion labs with no high-tech equipment, convert it into crystal form. Methamphetamine is then pressed into a tablet form which looks like ecstasy in a more attractive shape to appeal first time buyers. Meth manufacturing produces many harmful substances that will remain in the environment for a long period of time (11).

Specific states in the USA apply a real-time electronic logging system called the National Precursor Log Exchange (NPLEx). By using these system pharmacists can track sales of OTC medications that include pseudoephedrine (12).

In Iran, following confirmation of confidential reports about the use of colds containing “pseudoephedrine” for

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the manufacture of "glass", Food and Drug Administration revoked the license to manufacturers of the drugs containing pseudoephedrine and changed the composition of all cold medicines.

According to the head of the Iran Anti-Drug Police Research Center, cold tablets were also smuggled from the Turkish and Syrian border. The analysis showed that the glass was not made from pure pseudoephedrine but from the pseudoephedrine contained in the pills. Even though that the pills are abused, no control is exercised.

seven years after the authorities warned against the use of cold compounds in 2009, It was removed from the country's medication system by the Ministry of Health. Still, this delayed action resulted in a rise in the price of "glass". The import of pseudoephedrine was restricted from 55 to 7 tones. Production of all medications containing pseudoephedrine except the common cold syrup and the pseudoephedrine syrup, were stopped. The available syrups would be removed from the market as soon as the alternative was introduced. Also, the syrup is not usable nor economical for the glass producers. To date, we have not had any reports of smuggling of the syrup (13).

There are not many researches available in Iranian population on the abuse of meth or information on the number or characteristics of the users or its production. According to one Iranian study, females were more prone to use methamphetamine on daily basis, while, males tend to use methamphetamine injection more (14).

Methamphetamine abuse may be treated by behavioral therapies, medications such as ibudilast and minocycline or bupropion, vaccines, neurofeedback and stimulation of the brain noninvasively also called Transcranial Magnetic Stimulation (TMS). These experimental treatments are not available in many places and need more investigations for more reliable applications (15).

Methamphetamine addicts may recover if the current treatment strategies are accessible. To my knowledge these potential treatments for metamphetamine addiction either do not exist or are not applied in Iran.

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