

Crystal Methamphetamine use, a bomb of mass population health destruction: A Systematic review and meta-analysis on its effects

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Background

Since 2000, the National survey on Drug Use and Health (NSDUH) realized that the use of crystalmethamphetamine is keeping on increasing. In 2005 NSDUH conducted a survey and revealed that over than 10 million people teenagers and adults have tried to use Crystal meth at least more than once in their lifetime[1][2]. round 1.3 million people reported using Crystal meth between before 2005 and 512, 000.00 reported using Crystal meth within the last month before the statistic was taken[3][4][5][7][8][9]. From the result of the University of Michigan's Monitoring the Future Survey, nearly 5 % of high school seniors in the United States used Crystal meth at least once in their lifetime and 3% used in the past year[6]. Crystal meth users who inject the drug expose themselves to additional risks, including contracting HIV, hepatitis B and C, and other blood-borne viruses. Chronic users who inject Crystal Meth also risk scarred or collapsed veins, infections of the heart lining and valves, abscesses, pneumonia, tuberculosis, and liver or kidney disease[7][8][9].

Definitions

Crystalmethamphetamine is one form of the drug methamphetamine. It is a white crystalline drug that people take by snorting it (inhaling through the nose), smoking it or injecting it with a needle. Some even take it orally, but all develop a strong desire to continue using it because the drug creates a false sense of happiness and well-being (drugfreeworld.org). Crystal meth is short for crystalmethamphetamine. Drug in the same class as cocaine and other powerful street drugs. It is nicknamed in America and Europe as meth, crank, chalk, speed, beannies, brown, chicken feed, cinnamon, crink, cypto, fast, get go, methlies quik, Mexican crack, pervitin (Czech republic), redneck cocaine, tick tick, tweak, wash, yaba (South East Asia), yellow powder, and Ohana. In Africa, Asia and Austrelia: Batu, blade, cristy, crystal, crystal glass, glass, hot ice, ice, quartz, shabu, L.A. glass, L. A. Ice, shards, hiropon, stove top, kaksonjae, vidrio, tina, ritalin, banyak, and ventana. These drugs effects generally last from

six to eight hours, but can last up to 24 hours. Throughout the world, crystal meth is used by individual of all ages, but is most commonly used as a leisure in club and heavy carrier labourers[13][14][15].

Characteristics of Crystalmethamphetamine

Crystal meth is a dangerous and potent chemical, and as with all drugs, a poison that first acts as a stimulant but then begins to systematically destroy the body. Thus it is associated with serious health conditions, including memory loss, aggression, psychotic behaviour and potential heart and brain damage. Crystal meth is highly addictive, meth burns up the body's resources, creating a devastating dependence that can only be relieved by taking more of the drug. It is one of the hardest drug addictions to treat and many die in its grip. This drug is highly concentrated, and many users report getting hooked. It influence loss of profession, home, friends, and family members. High dose of meth that is synthetic (man-made) chemical, unlike cocaine, for instance which comes from a plant. Crystal meth is commonly manufactured in illegal, hidden laboratories, missing various forms of amphetamine (another stimulant drug) or derivatives with other chemicals to boost its potency. Common pills for cold remedies are often used as the basis for the production of the drug. The meth or cook extracts ingredients from those pills and to increase its strength combines the substance with chemical such as battery acid, drain cleaner, lantern fuel and antifreeze. These dangerous chemicals are potentially explosive and because the meth cooks are drug users themselves and disoriented, they are often severely burned and disfigured or killed when their preparations explode. Such accidents endanger others in nearby homes or buildings. The deadly effects of crystal meth create weight loss, disturbed sleep patterns, and hyperactivity, and nausea, delusions of power, increase aggressiveness and irritability. The effects of crystal meth are short-long term[10][11][12].

Crystalmethamphetamine use in Canada has received considerable media attention in recent years as the source of significant health, social, and economic harms for users of the drug and their communities (Lee et al., 2005). High rates of crystal methamphetamine use in Canada among certain groups, particularly street youth, gay and bisexual youth, and rave attendees, suggest growing popularity of the drug (Martin et al., 2006). In British Columbia, crystal

methamphetamine-related deaths have increased from 3 in 2000 to 33 in 2004, most commonly as a result of overdose or motor vehicle accidents (Martin et al., 2006). Despite the extensive media attention and legal changes that have been made to address the growing problem of crystal methamphetamine use in Canada, surprisingly little research has been conducted to assess purported increase in use of the drug. In Ontario, Canada CM has been reported as a growing problem. These populations that have been focused on largely include the youth/young people, men who have sex with men, and female sex workers. Focus largely has also been on health outcomes (sexual risk) compared to social and economic outcome related[7][8][9].

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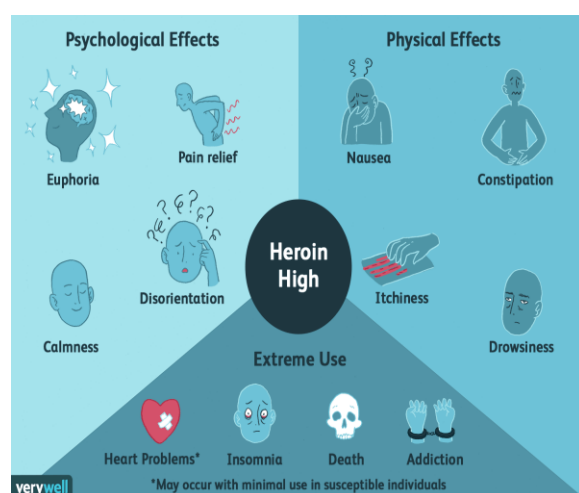


Fig 1. Psycho-social and physical effects. By Dillon P. et al, 2015.

Worldwide, Crystal methamphetamine (CM) use and associated high-risk sexual behaviors are a concern, but most of studies are done among men who have sex with men (MSM) and

less studies have been done among female sex workers(FSW) in developing countries (Guadamuz, 2018), (Skokookim, 2018)[10][11][12].

There is the need for information on the social and economic outcomes related to Crystal Meth use as well, in order to better understand its effect on other spheres to ensure an effective solution.

Methods

The systematic review and meta-analysis was done to describe the characteristics, to determine the types, treatment of the crystal meth outcomes and show its effects as a bomb of mass of population health destruction in the world. We followed the guidelines developed and recommended by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) group.

Search strategy

We conducted a comprehensive review of 3 electronic databases (Embase, PsychInfo and MedLine) to identify potentially relevant studies. Following a systematic review of literature, we came up with 947 articles related to effective treatment of crystal methamphetamine. These were subjected to title screening and the number was reduced to 11 articles. The remaining articles were subjected to full-text screening and only two articles met our inclusion criteria on treatment strategies for crystal methamphetamine. However, one of the articles was among a sample of men who have sex with men (MSM) and the second study was among crystal methamphetamine dependent patients.

For socioeconomic impact of crystal methamphetamine, 160 articles were found and screened down to 2 based on the relevance of socioeconomic outcomes associated with Crystal Meth use. Other information was supplemented with published reports, newspapers and other journal articles. Summary of the results are presented below:

Results

Components of crystal methamphetamine

The common drug combinations. Crystal meth as the highest dose of methamphetamine interactions is incredibly dangerous and even fatal. It is composed exactly by meth and mixed with the following:

- (1) Alcohol: the stimulant effects of methamphetamines can mask the sedative effects of alcohol and lead to someone drinking more than they would typically drink. Concurrent consumption can also lead to high blood pressure, increased psychosis and hallucinations, chronic liver damage, cancer and sudden death.
- (2) Opiates: people often mix meth and opiates for the polydrug combination known as speedball. Morphine is one of the most common opiates used for this combination. The combination produces a high for greater than either drug can generate on their own. Speedball will often cause the user to have difficulty walking, as well as suppressed avoidance responses. This makes them more likely to injure or cause harm to themselves and others. This combination of drugs also increases the likelihood that an individual will overdose on opiates as the methamphetamine speeds up their circulatory system.
- (3) Xanax: anxiety is a common negative side effect of methamphetamine use. Xanax, an anti-anxiety medication, can be used to combat these negative feelings. The result is an anormously addicting combination that can often lead to heart issues. As the meth speeds up the heart, the Xanax slows it down. This can make the heart beats in an irregular pattern, which can sometimes lead to heart failure.
- (4) Suboxone: as a powerful prescription narcotic designed to help ease the transition away from opiates, suboxone is a dangerous drug to combine with meth. The drug contains a low dose of opiates and will dull many of the effects of the meth. The combination produces a mild form of speedball and like its more potent cousin, can make user think that their body can handle more of either drug even when it cannot, leading to overdose.
- (5) Klonopin: formulated to treat seizures, panic disorders and anxiety, meth misusers often believe that klonopin can help them come down from a high. Masking the effects of the meth, it can lead users to overdose. In some cases, klonopin can also mask the cardiac effects of meth and eventually lead to heart failure.
- (6) Ecstasy: chemically similar to both a stimulant and a hallucinogenic, ecstasy, also known as MDMA or Molly

that gives it user energy, pleasure and a distorted sense of place and time. When combined with meth, it can increase the likelihood of a user overheating. At a certain temperature, the body begins to shut down, which can be fatal. (7) Viagra: Both Viagra and meths are associated with risky sexual behaviour. This combination of drugs is particularly popular in the gay community. Given that increased transmission of STIs is common among users of either drug, this particular illicit concoction is highly associated with the transmission of sexually transmitted infections and diseases[1][2].

Pharmacological Treatments

No studies were found involving the effectiveness of pharmacological treatments for crystal methamphetamine use among adults.

Psychosocial Treatments

Only one study reported on the effectiveness of a psychosocial treatment among HIV-uninfected men who have sex with men (MSM) abusing crystal methamphetamine. Findings from this study showed that 10 sessions of Behavioural Activation (BA) with integrated HIV Risk Reduction counselling (RR) led to a significant decrease over time in the number of crystal methamphetamine episodes in the past 3 months and the number of days of crystal methamphetamine use in the past 30 days. Mean unprotected anal intercourse (UAI) episodes decreased significantly from baseline to acute postintervention and from baseline to 6 months postbaseline. Significant reductions in depressive symptoms and poly-substance use were also maintained. There is support in the addiction literature for the effectiveness of behavioural activation in reducing substance use (e.g. Daughters et al., 2018; Fazzino, Bjorlie, & Lejuez, 2019). For instance, Fazzino et al. (2019) in a systematic review on the effectiveness of behavioural activation on substance use concluded that evidence supports the efficacy of reinforcement-based interventions such as BA in targeting substance use outcomes[16][17][18][13].

The examination of crystal meth and amphetamine were only on social effects. It was known that a considerable number of Female Sexual Workers use of Crystal Meth along with opioids, have a higher number of sexual partners, forced sex, and housing instability. The use

of Crystal Meth goes back into the late 1960's but because of numerous successful campaigns, the drug was cleared off the streets in the 1970's. However, in the early 1990's the market for Crystal Meth reopened and today it is one of the most commonly abused illegal substances in most of countries. Typically, one-tenth of a gram of Crystal Meth in tablet form costs \$5.00 to 20.00 in Europe and America, but in the rest of the world the price is higher than \$20.00 especially where is sold as ecstasy.

Media information and interviews

Symptom	% of crystal meth users	% of amphetamine users ^a	OR	95% CI	
Heart palpitations/chest pains	71	35	4.55	2.26	9.14
Anxiety	70	72	0.91	0.45	1.83
Tremors/shakes	67	55	1.66	0.85	3.26
Paranoia	64	71	0.73	0.37	1.42
Depression	62	71	0.66	0.34	1.30
Numbness/tingling	47	46	1.04	0.55	1.97
Shortness of breath	43	55	0.62	0.32	1.18
Burning mouth/throat	40	40	1.00	0.52	1.92
Vomiting/nausea	40	37	1.14	0.59	2.18
Headaches	39	62	0.40	0.20	0.75
Violent behaviour	24	43	0.42	0.20	0.87
Panic attacks	20	9	2.53	1.07	5.96
Hallucinations	20	46	0.29	0.14	0.64
Dizziness	20	49	0.26	0.12	0.56
Blackout/memory lapse	13	22	0.53	0.21	1.33
Fits/seizures	2	8	0.23	0.03	2.00

Tab.1. A comparison of the psycho-social and physical side effects reported by Crystal meth and amphetamine users, By Louisa Degenhardt, 2002.

Pharmacological and Psychosocial Treatments

One study examined effectiveness of Neurofeedback Training and SSRI among crystal methamphetamine dependent participants. Findings from the study showed that a two month Neurofeedback Training (30 sessions-50mins per session) + Pharmacotherapy resulted in decreased severity of addiction, better psychological health, and better quality of life. However, it is worth noting that the authors did not specify.

Social Outcomes

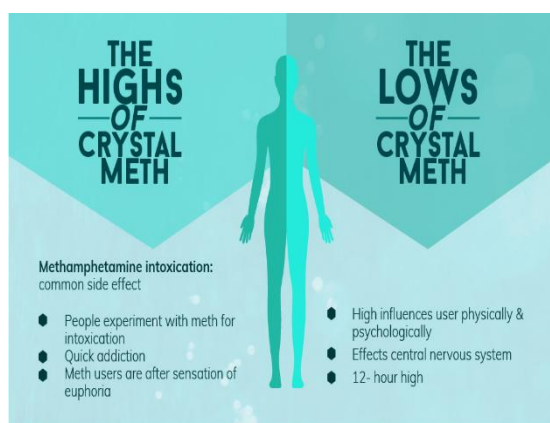
CM use has been associated with school students and work-related issues. For instance, with homework completion, work productivity and preparation for exams (Ayres and Jewkes, 2012).

Short term effects

Loss of appetite, increased heart rate, blood pressure, body temperature, brief surge of energy (Euphoria), insomnia, dilatation of pupils, paranoia, disturbed sleep patterns, nausea, bizarre, erratic, sometimes violent behaviour, hallucinations, hyper-excitability irritability, panic and psychosis, convulsions, seizures and death from high doses.

Long- term effects

Permanent damage to blood vessels of heart and brain, high blood pressure leading to heart attacks, strokes and death, liver, kidney and lung damage, destruction of tissues in nose if sniffed, respiratory (breathing) problems if smoked, infectious diseases and abscesses if injected, malnutrition, weight loss, severe tooth decay, disorientation, apathy, confused exhaustion, strong psychological dependence, psychosis, depression, damage to the brain similar to Alzheimer's disease stroke and epilepsy, weekend immune system.



Crystalmeth Detox

Detoxification is a natural process by which the body rids itself of the harmful chemicals in it. Methamphetamine detox will rid the body of all traces of the drug. Withdrawal is a major part of the detox process, and generally, the most integral section of the experience.



Fig.2 and 3. Crystalmeth effects. By the recovery village.com (Kevin wandler).

The Crystalmeth detox process can be extremely unpleasant for those who have been under the drug's influence for a long period of time. Those who have a drug dependency or are addicted to Crystalmeth will experience meth withdrawal symptoms. Some of the most common symptoms are fatigue, depression, anxiety and increased appetite. These are all signs that the body is ridding itself of the crystalmethamphetamine, flushing out toxins and returning to a state of health

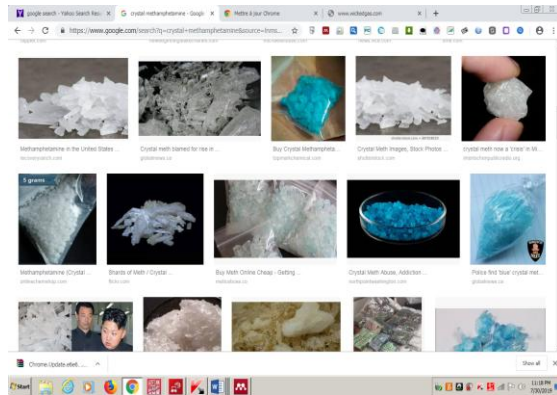
Limitations

There is a paucity of studies in the two areas of studies. For example, the available studies focused on MSM. This limited the scope of the study.

Steps Forward

Further studies need to be conducted within the areas of socioeconomic outcomes and effective treatment strategies among the general adult population who use crystal methamphetamine.

Images of types of crystal methamphetamine



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