

The pointy end of crystal

Created 19 Jan 2006 - 12:06am

With an emerging body of evidence showing that regular crystal meth use can cause changes to the structure and functioning of the brain, positive people have good reasons to be cautious about this drug.

The words 'crystal meth, gay men and HIV' are a touchy combination. They conjure images like those in recent spate of articles and commentaries from the United States, where the so-called 'crystal crisis' is hyped with bizarre tales of sex-crazed gay hedonists consuming 'Tina' by the truckload, rampaging through the internet or in backrooms and, to quote from a recent article in The New Yorker, partaking in sexual activities ranging "from unbelievable to outrageous" (code for, among other things, 'HIV-positive men having sex without condoms').

In Australia, there's been claim, counterclaim and rhetorical [arm](#) [1]Any of the treatment groups in a randomised trial. Most randomised trials have two "arms," but some have three "arms," or even more.-folding about whether or not crystal use 'causes' unsafe sex, and if or how it has played a role in increased HIV transmission among gay men over the last few years.

But the politicisation of this debate, emphasising sex and transmission, has muted the conversation about an equally important development: emerging evidence of the significant personal risks and harms associated with long-term regular crystal use. For people living with HIV/AIDS, these risks could have additional significance.

Behavioural and mood changes

Though related to garden-variety amphetamine (speed), methamphetamine (crystal, crystal meth, ice, Tina) is structurally different and more complex.

For several years, there have been relatively widely-reported concerns about the effects of long-term use on behaviour, mood and thinking patterns. Most recently, the National Drug and Alcohol Research Centre (NDARC), reported regular crystal users (twice a week or more) had rates of short and long-term psychosis up to eleven times those in the general population. Often, psychotic episodes involved hostility, aggression and violence, including furniture being thrown or people being assaulted.

An important question might therefore be raised as to whether HIV compounds the negative effects of crystal on mental health, given that research shows up to one-third of people with HIV already report depression or anxiety problems, with much higher rates of prescription antidepressant use than in HIV-negative people.

Crystal, HIV and the functioning of the brain

But there has also been some sobering news about the effects of regular methamphetamine use on brain structure and chemistry – with important and potentially troubling implications for people with HIV.

Research published in August 2005 in the American Journal of Psychiatry argued that regularly using methamphetamine can affect brain structure and function, and these problems may be exacerbated for the worse in people with HIV because of changes that the [virus](#) [2]A small infective organism which is incapable of reproducing outside a host cell. itself can cause in the brain. Earlier work by a different group of researchers, published in the same journal in February 2005, also indicated that regular crystal use can have harmful effects on brain function, with regular use (twice or more a week for a year) adding to neuronal damage which can be caused by HIV.

The research published in August was conducted by the Neurobehavioural Research Centre at the University of California San Diego. They studied 103 adults, divided into four groups:

- HIV negative, didn't use crystal;
- HIV negative, with a history of crystal dependence;

HIV positive, didn't use crystal; and
HIV positive, a history of crystal dependence.

('Dependence' in this study was defined using internationally-accepted criteria. Symptoms can include: work or social activities being impaired by use of a drug; increasing tolerance (needing more and more to get an effect); an inability to stop taking the drug despite wanting to; physical and psychological withdrawal; and large amounts of time spent taking, or recovering from, the drug).

Brain scans were carried out, and different regions of the brain assessed.

Neurological tests assessed memory; information processing; abstract thinking and reasoning; verbal fluency; and coordination.

One of the key findings was that both HIV infection and regular crystal use independently appear to cause changes to brain structures. The changes caused by HIV are different to the changes caused by crystal use, and they often, though not always, occur in different regions of the brain.

The changes in the brain in the crystal users were no different in people with HIV than in HIV-negative people. Rather, people with HIV and who also used crystal were at risk of the 'additive' effects of what is effectively a two-pronged attack on brain structure and function. In other words, the brain is being attacked on two fronts, by both HIV and crystal.

In people with HIV, regardless of age, the study showed a loss of the volume (or amount of matter) in particular brain structures. These included loss of volume in the hippocampus and in the cerebral cortex. The hippocampus is an important part of the brain, and damage to this region can have effects such as impairing the ability to form memories. The cerebral cortex is the outermost layer of the brain, commonly referred to as 'grey matter'. It performs many functions, including sense perception, movement and coordination skills, abstract thought and memory.

Methamphetamine's effects on the brain were different, in that it actually increased the volumes of particular brain structures. However, these increases in volume in parts of the brain emphatically don't mean that you therefore have better brain function. 'More' is not 'better'. These increases in volume are apparently caused by the growth of particular protein structures, and were associated with impairment of brain function in the dependent crystal users.

For HIV-positive people who also had a history of dependent crystal use, the study found that decreases in the volume of the hippocampus were associated with greater neuropsychological and cognitive impairment than in the positive people who didn't use crystal, and than both the other groups.

The other, worrying, observation about crystal use was that changes to these brain structures appeared more pronounced in younger crystal users. This could be because there may be more prominent effects from crystal use early in the course of use and dependence, or that younger people's brains may simply respond differently to exposure to methamphetamine.

In February 2005, the same journal published the results of brain scans of 68 HIV-positive and 75 HIV-negative volunteers. In the HIV-positive group, 24 had used crystal twice weekly or more for a year, and in the HIV-negative group, there were 36 crystal users.

This study, which looked at levels of various brain chemicals and markers, suggested that the long-term regular use of crystal can exacerbate the damage to brain cells caused by HIV, and also found that the effects were additive, with crystal appearing to affect the brain in additional, subtly different ways to HIV. The researchers speculated this could be because crystal releases large amounts of a brain chemical called dopamine, which can cause damage to neurons, the brain cells which transmit information to nerves.

Why is this all important?

While HIV treatment reduces [viral load](#) [3]A measurement of the quantity of HIV RNA in the blood. Viral load blood

test results are expressed as the number of copies (of HIV) per milliliter of blood plasma. and prevents many people from losing CD4 cells or getting sick, these drugs may not always protect the brain from damage from HIV. While AIDS dementia is relatively rare these days, a number of studies have shown that HIV can cause some changes to the brain, such as loss of brain tissue, which occur at higher CD4 counts than does AIDS dementia, and which can occur in areas of the brain which regulate things like language, movement, coordination and reasoning.

Not to be alarmist, these changes caused by HIV are typically small and their effects negligible in terms of daily living. Nonetheless, the researchers who carried out the crystal studies suggest that overall, people with HIV who regularly used crystal did significantly worse than nonusers on several measures of neurocognitive functioning (brain functions like memory, attention and problem solving).

The authors of the August study believe the changes in the brain they observed could be a result of inflammation of the brain and the toxicity of crystal. Brain inflammation is also known to occur as a result of HIV.

Is crystal different?

We've known for some time that a number of recreational drugs, including ecstasy (MDMA), can affect brain chemistry. However, these studies add to an earlier body of research which has shown that regular crystal users can exhibit some changes which are similar to those associated with HIV dementia, like slower reaction times, and poorer memory, attention span and concentration skills.

It seems that the mix of regular crystal use over a long time can pose a real risk for people with HIV – and it highlights the need for a better understanding of the extent of the problem. Crystal can be powerfully addictive, making quitting hard, and there is a lack of services and support, or good [clinical](#) [4] Pertaining to or founded on observation and treatment of participants, as distinguished from theoretical or basic science. information about how to do it. The authors of this research have suggested medications to reduce brain inflammation might be useful in treating dependent crystal users.

In common with most recreational drugs, heavy crystal use carries substantial longterm health risks; that's something that has been clear for some time and is compounded by the drug's powerful addictive pull. For people with HIV who use crystal, this new research suggests the drug carries extra dangers which may have profound long-term effects.

If you're trying to stop using crystal and you want help, ask [your local PLWHA group](#) [5] to refer you to recommended services in your state.

REFERENCES

¹ Jernigan T et al. Effects of methamphetamine dependence and HIV infection on cerebral morphology. Am J Psychiatry 162, 2005

² Chang L et al. Additive effects of HIV and chronic methamphetamine use of brain metabolite abnormalities. Am J Psychiatry 162: 361-369, 2005

- [neurological conditions](#)
- [recreational drugs](#)

Links:

[1] <http://www.napwa.org.au/glossary/term/470>

[2] <http://www.napwa.org.au/glossary/term/125>

[3] <http://www.napwa.org.au/glossary/term/416>

[4] <http://www.napwa.org.au/glossary/term/475>

[5] <http://www.napwa.org.au/?q=services>

