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***An investigation into the relationship(s) between the
different chemical classes of synthetic cathinones and
their effects: desired, adverse and toxic***

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Overview

- Background
- Reasons for using synthetic cathinones
- Reasons for using specific types of synthetic cathinones
- Defining synthetic cathinones
- Aims of the study
- Methods for ascertaining reasons for use
- Emerging findings from phase 1: online survey
- Next steps
- References
- Acknowledgements



2



Background

Number of synthetic cathinones

UNODC - the number of synthetic cathinones identified/reported from 7 in 2008 to 68 by the end of 2014 about 55 in 2015 (provisional data) (UNODC, 2016b).

During 2005 - 2016 the cumulative number of such molecules reported to the EMCDDA was 118. 14 were reported for the first time in 2016 (EMCDDA-Europol, 2017); currently (18 October 2017) this total has increased to 128.

Seizures of synthetic cathinones

The amount of synthetic cathinones confiscated has risen greatly since they were first reported in 2010 (UNODC, 2016a).

2010 & 2011 < 200 kg

2012 & 2013 c. 400 kg

2014 1.3 tons

Of which,

Eastern Europe (692 kg in the Russian Federation),

Western and Central Europe (312 kg in England and Wales)

East and South-East Asia (226 kg in Hong Kong, China).



Background

In 2015, synthetic cathinones accounted for the largest class of NPS (one-third): 25,000+ seizures (17,000 in 2014).

Quantity seized in 2015 1.8+ tonnes (1.05 tonnes in 2014).

Five most commonly seized cathinones in 2015 were alpha-PVP, 3-MMC, ethylone, 4-CMC and pentedrone.

Prevalence data

No global data, no EU trend data

Available data from EWS (e.g. Ecstasy and Related Drugs Reporting System in Australia), national household surveys (e.g. Crime Survey for England and Wales), high-school student surveys (e.g. Monitoring the Future in the USA), the Mixmag/Global Drug Survey, and ad-hoc surveys have mostly focused on mephedrone. These have indicated a decline in last year use of mephedrone from a peak in 2010/1 (typically), although there are regional differences as to when the peak occurred.

Estimated in 2012-3 that last year mephedrone use amongst European adults aged 16-59 years reached 0.5%.

Use is higher in some sub-groups, and general population prevalence rates vary between countries

Other cathinones, such as MDPV and NRG-1, have been covered by surveys. These too also show declines over time, especially related to changes in legislation and improving availability and purity/potency of traditional stimulants.



Background

Injecting

There is increasing concern about the injecting of synthetic cathinones by both stimulant users and problem opioid injectors.

Deaths

Continuing increase in the number of deaths involving synthetic cathinones in some countries, e.g. UK.



Reasons for using synthetic cathinones

One can draw a distinction between motivations (which may include more subjective influences) and reasons (which may be more objective, logical, rational and determined, in part, by external influences) for the use of psychoactive substances.

A range of reasons are reported for using synthetic cathinones, including: hallucinogenic experiences, euphoria, mood enhancement, openness in communication, empathy, mental clarity, increased alertness, insomnia, stimulation, intensification of sensory experiences, increased energy, reduced appetite, increased sociability, increased libido and sexual performance (Rosenbaum et al., 2012; Schifano et al., 2016).

Motivations for use of synthetic cathinones have varied over time, in different countries and amongst different user groups. Increased availability, ease of purchase via the Internet, perceived legality, assumed high purity, perceived better high, fewer side effects, safer to use and short duration of action have all been cited as reasons for using synthetic cathinones by a sub-sample of ecstasy users in Australia in 2014 (Sutherland et al., 2017).

Surveys of and interviews with users suggested that the increased popularity and convenience of purchasing mephedrone was associated with the unavailability, high price and impurity of several stimulants, chiefly amphetamine, cocaine and MDMA (ACMD, 2010; Carhart-Harris et al., 2011; Measham et al., 2010). So it is practical issues in obtaining the drugs rather than a preference of their psychopharmacological effects that plays a role.



Reasons for using specific types of synthetic cathinones

There are problems with ascribing particular effects to specific types of cathinones and asking users about them.

The number of papers which have come closest to achieving this is very small, i.e.: Winstock et al. (2011); Cahart-Harris et al. (2013); Johnson and Johnson (2014); and Ashrafioun et al. (2016).

The first paper demonstrated that a web-based survey recruiting from an existing survey (Mixmag) could be employed to study users' experiences, but only contained a limited number of questions exploring motivations for use of particular types of synthetic cathinone.

The second study also used a web-based survey, recruiting through advertisements on user fora, to ask about specific subject effects but did not investigate reasons for use.

The third study followed a similar recruitment strategy to the second one and did get some information on reasons for using 'bath salts' as a generic class of drug: curiosity; mind/brain exploration; liking the effect; to remain alert/awake; to avoid failing drug tests; to enhance sexual experiences.



Reasons for using specific types of synthetic cathinones

The fourth study set out to overcome the limitations of the previous three, by using online recruitment through advertisements on specific websites; put a recruitment video in YouTube and purchased targeted advertisements on Facebook (Ashrafioun et al., 2016).

The commonest reasons, in decreasing order for first trying synthetic cathinones were: Curiosity, believing incorrectly that they were taking another substance; social pressure; having been offered 'bath salts'.

The main reasons given for consuming 'bath salts' were: fun/enjoyment/euphoria/rush; curiosity/new experience; substitution for another drug; being at a party /event. The authors note that the effects and motivations echo those who use other illegal stimulants, and are similar to those of the previous three studies.



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Defining synthetic cathinones

Typically, cathinones are classified according to their pharmacological action and in comparison to more traditional stimulant drugs. But there is no consensus on how to do this, or the categories to be used.

- Effects in terms of different substrates or non-substrate transporter inhibitors (Simmer et al., 2013).
- Comparisons with certain 'classical' classes of traditional drugs of abuse, i.e. MDMA, amphetamine/methylamphetamine, cocaine (Concheiro et al., 2013),
- Combinations such as MDMA/cocaine, together with chemical structure categories (Valente et al., 2014; Concheiro et al., 2013; Assi et al., 2017).
- Some of these approaches also single out pyrrolidines as a separate group.

These approaches lead to overlapping of categories and blurred distinctions.



Defining synthetic cathinones

Establishing a connection between different types of cathinones based on their DAT/SERT inhibition ratio, structural characteristics or other parameters and their similarity to traditional stimulants is difficult in the context of non-psychonaut consumers.

Employing a single criterion in terms of their similarity to the effects of 'classical' drugs of abuse would be best.

Therefore, a pragmatic approach has been adopted for a study being conducted by the lead author and colleagues into motivations for using specific types of synthetic cathinones, i.e. similarity to the effects of these classical drugs or combinations thereof, and the pyrrolidine group:

- amphetamine/methylamphetamine-like;
- cocaine-like;
- MDMA-like;
- MDMA + cocaine-like; and
- pyrrolidines/pyrovalerone-type.



Aims of the study

The original abstract stated that three classes of synthetic cathinones would be investigated. This has now been revised as indicated earlier. However, the principal aim remains unchanged:-

“ to explore the relationship(s) between these individual classes and the desired, adverse and fatal effects of commonly used molecules”.

The rationale for the study is that it is important for health professionals and investigatory authorities to know the effects of such substances.

Information from this study will need to be taken into account by health professionals faced with acute/chronic presentations in hospitals, and by those engaged in investigating newly emerging synthetic cathinones.

This study's principles could provide a template for documenting future research on synthetic cathinones and other drug classes with distinct sub-classes.



Methods for ascertaining reasons for using specific (classes of) synthetic cathinones

There are several ways of establishing why individuals use either specific cathinone molecules or particular classes of cathinones. However, there are problems with ascribing particular effects to specific types of cathinones and asking users about them. The wording of questions has to be very clear as to which of these is actually being asked about. It is unlikely that a non-psychonaut user will appreciate the distinction. It may even be the case that only very few psychonauts will feel it necessary to distinguish in this way what they consume.

The main methods are direct questioning through interviews, focus groups and surveys. Indirect methods could include observational, netnographic and even psychological autopsy approaches.

This project is using two main approaches, an online survey and netnography. Should access to detailed case-reports of fatalities become available, psychological autopsies could be also used.

The survey was activated 18 August 2017, and advertised on several user fora websites and DS Daily. It is a 42-item questionnaire, and takes about 10 minutes to complete.

As of 19 October 2017, there have been 76 accesses but this translates into only 32 completed/partial questionnaires.



Emerging findings from Phase 1: online survey

Demographics

Gender: Male 24; Female 7; Bi-sexual 1; total 32

Sexual orientation: Heterosexual 25; homosexual 2; bi-sexual 1; prefer not to say 1; other (unspecified) 1.

Age: mean 38.8; range 20-63.

Country of residence:

Australia 2

Finland 1

Greece 1

Italy 3

Netherlands 1

Spain 1

Sweden 1

Switzerland 1

United Kingdom 8

United States 11

Ethnicity: Anglo-Saxon 1; British Asian 1; Caucasian 7; European 2; Russian 1; White 8; White (specified) 6; other 2.

Marital status: Civil Partnership 1; Single 14; Married 11; Divorced 2; other 3.



Emerging findings from Phase 1: online survey

Highest level of education:

High-school graduate 3

Some college but no degree 9

Associate degree in college 1

Bachelor's degree 7

Master's degree 5

Professional degree 4

Doctoral degree 1

Employment status:

Employed 20; self-employed 5; unemployed 3; other 2



Emerging findings from Phase 1: online survey

Reasons for using cathinones & specific types

Main reasons for using cathinones (n=4):

Recreational use (social)

Experimentation & self-exploration

Always combined with porn

History of depression, use is something to plan and look forward to

Reason(s) for using specific types (n=2)

Mood lift, empathy, increased desire for conversation; Empathogenic – butylone

Pleasure watching porn; Euphoric - 'hexen' @ 50mg doses x4 over 4hr. mdpv in 2013 unknown



Emerging findings from Phase 1: online survey

Detailed comments only from a single butylone user

Effects experienced:

“Mood lift, conversation comes easy, feel much more invested in listening to people talk about their lives”

Side-effects:

“Impaired short-term memory, Tightened jaw muscles, grinding teeth, Muscle twitching, Dizziness, lightheadedness, vertigo”

Reasons for stopping use:

“They were not that interesting and after they became controlled drugs, the trouble involved to obtain them was not worth it”

Additional remarks:

“I have used synthetic cathinones (butylone only) only three times, some years ago (threw it away when I moved and now that it is illegal, I don't have a supplier). I have been prescribed bupropion but did not include my experiences it in this survey; even though it is a cathinone, I assume it's somewhat out of scope due to being a licit, prescribed medication.”



Emerging findings from Phase 1: online survey

Tentative conclusions

The level of completion for the details being sought is very low and disappointing.

That said, when respondents do engage with the survey it is possible to obtain some very interesting and revealing information.

It look as as if the questions work alright.

It might be that the number of questions, and hence the length of time to complete the survey, is off-putting.

The url link name is not appealing, so changing it to reflect the subject under investigation would perhaps help it stand out for.

This phase can be treated as a pilot study, and the process of promoting the survey needs to be reviewed and improved.

Perhaps a slimmer questionnaire would be more attractive.

The emerging findings can inform the other two phases.



Next steps

- Further promote the online survey; consider translating it into other languages - Please help to advertise it!!!

https://herts.eu.qualtrics.com/jfe/form/SV_bPd1GHN12qxMSih

- Document desired effects and adverse effects, including toxic ones, from online user fora and social medial platforms; this will also feed into the next phase
- Use mortality and other data supplied for the EU-MADNESS project to investigate possible relationships between types of synthetic cathinones and cause(s) of death
- Submit papers based on these activities to peer-reviewed journals



18



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19



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20



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21



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22



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23



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24

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Survey on the Use of Synthetic Cathinones

This survey is part of a wider research project looking at the use of synthetic cathinones. This survey aims to understand reasons for using these molecules, what effects were expected and what was actually experienced, including unwanted and adverse effects. This survey will take about ten minutes to complete

https://herts.eu.qualtrics.com/jfe/form/SV_bPd1GHN12qxMSih



25

