Ketamine analogue Methoxetamine and related deaths in the UK during 2011-2012: descriptive and clinical characteristics of national programme on Substance Abuse Deaths (np-SAD) cases

Stefania Chiappini, Hugh Claridge, Carla Gimeno Clemente, Barbara Loi, Christine Goodair
International Centre for Drug Policy, St George’s, University of London, Cranmer Terrace, London SW17 0RE
chiappi@ssgul.ac.uk

INTRODUCTION
Methoxetamine\(^1\), as an analogue of ketamine (Figure 1., Figure 2.), acts similarly to a non-competitive antagonist at the N-methyl-aspartate receptor and a Dopamine reuptake inhibitor. Its behavioural effects resemble those induced by dissociative anaesthetics\(^2\), including euphoria; empathy; dissociation from the physical body; and hallucinations. Adverse side effects include confusion; psychomotor agitation; and cognitive impairment. Although methoxetamine was the first drug ever to be given a Temporary Class Drug Order (TCCO) by the government (implemented April 2012)\(^3\), which was then converted to a class B drug classification (February 2013)\(^4\), its misuse\(^5\) appears to be increasing\(^6\). Several cases of acute toxicity reported hyper activation symptoms\(^7\).

METHODS
A literature search on “Methoxetamine”, “Methoxetamine effects”, “Methoxetamine toxicity”, “recreational use of dissociative anaesthetics”, “use of ketamine-like psychoactive substances”, using PubMed and Medline databases was conducted. Analyses were performed using data extracted from the database of the National Programme on Substance Abuse Deaths (np-SAD)\(^8\). The Programme has been collecting and analysing drug-related deaths in the UK since 1997, and maintains a database of more than 28,000 cases, with Coroners and relevant regional authorities voluntarily submitting information on drug-related deaths on a daily basis. A search was performed of the entire np-SAD database for deaths involving methoxetamine.

RESULTS
Between 2011-2012 methoxetamine was reported as involved in the deaths of six individuals: five males and one female, with a median age of 32 years. Methoxetamine was the sole drug implicated in two cases, whilst in three it was found in combination with other drugs. In one case it was found at post mortem but was not implicated in the death.

UK MXE cases (2011-2012)

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>Cause of Death</th>
<th>Manner of Death</th>
<th>Post Mortem Drugs</th>
<th>Implicated Drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>17 Drowning</td>
<td>Accidental</td>
<td>MXE, alcohol</td>
<td>MXE</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>25 Drowning</td>
<td>Accidental</td>
<td>MXE, alcohol, dihydrocodeine</td>
<td>MXE</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>27 6-APB and MXE ingestion</td>
<td>Undetermined</td>
<td>6-APB, MXE</td>
<td>6-APB, MXE</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td>30 Drug overdose</td>
<td>Accidental</td>
<td>MXE, methadone, mirtazapine</td>
<td>MXE, methadone, mirtazapine</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>42 Ischaemic Heart Disease</td>
<td>Accidental</td>
<td>MXE, alcohol, MPA, MDA</td>
<td>MXE</td>
</tr>
<tr>
<td>6</td>
<td>M</td>
<td>44 MXE and MPA toxicity</td>
<td>Accidental</td>
<td>MXE, MPA</td>
<td>MXE</td>
</tr>
</tbody>
</table>

CONCLUSIONS
This poster represents the largest known case series of methoxetamine-related fatalities in the UK. Among all psychoactive substances, methoxetamine appears to be a protagonist of the recreational drug scene in the Uk’s considering its increasing abuse\(^9\) and limited scientific studies on it, the next step should be to investigate its toxicity; abuse liability; and long term risks.

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REFERENCES