Research paper

Results of an international drug testing service for cryptomarket users

Fernando Caudevilla a,b,* , Mireia Ventura b , Iván Fornís b , Monica J. Barratt c,d,e , Claudio Vidal b , Cristina Gil Ildanosa b , Pol Quintana b , Ana Muñoz b , Nuria Calzada b 

a C.S. Puerta Bonita I. SERMAS, Madrid (Spain) c/ Alegria 24, 28028 Madrid, Spain
b Energy Control (ABD), Barcelona (Spain) C/Ilibertat, 27, 08012 Barcelona, Spain
c Drug Policy Modelling Program, National Drug and Alcohol Research Centre, UNSW Australia, Sydney, NSW 2052, Australia
d National Drug Research Institute, Faculty of Health Sciences, Curtin University, GPO Box U1987, Perth, WA 6845, Australia
e Centre of Population Health, Burnet Institute, 85 Commercial Road, Melbourne, Victoria 3004, Australia

ARTICLE INFO

Article history:
Received 6 August 2015
Received in revised form 18 March 2016
Accepted 29 April 2016

Keywords:
Cryptomarkets
Drug markets
Purity
Adulterants
Drug checking
Drug trend monitoring

ABSTRACT

Introduction: User surveys indicate that expectations of higher drug purity are a key reason for cryptomarket use. In 2014–2015, Spain’s NGO Energy Control conducted a 1-year pilot project to provide a testing service to cryptomarket drug users using the Transnational European Drug Information (TEDI) guidelines. In this paper, we present content and purity data from the trial.

Methods: 219 samples were analyzed by gas chromatography associated with mass spectrometry (GC/MS). Users were asked to report what substance they allegedly purchased.

Results: 40 different advertised substances were reported, although 77.6% were common recreational drugs (cocaïne, MDMA, amphetamines, LSD, ketamine, cannabis). In 200 samples (91.3%), the main result of analysis matched the advertised substance. Where the advertised compound was detected, purity levels (m ± SD) were: cocaine 71.6 ± 19.4%; MDMA (crystal) 88.3 ± 1.4%; MDMA (pills) 133.3 ± 38.4 mg; Amphetamine (speed) 51.3 ± 33.9%; LSD 123.6 ± 40.5 μg; Cannabis resin THC: 16.5 ± 7.5% CBD: 3.4 ± 1.5%; Ketamine 71.3 ± 38.4%. 39.8% of cocaine samples contained the adulterant levamisole (11.6 ± 8%). No adulterants were found in MDMA and LSD samples.

Discussion: The largest collection of test results from drug samples delivered from cryptomarkets are reported in this study. Most substances contained the advertised ingredient and most samples were of high purity. The representativeness of these results is unknown.

© 2016 Elsevier B.V. All rights reserved.

Introduction

Studies on cryptomarkets have focused on economic and criminological aspects (Aldridge & Décair-Hétu, 2014; Christin, 2013) and user characteristics and motivations (Barratt, Ferris, & Winstock, 2014; van Hout & Bingham, 2013). Higher purity of substances and lower rates of adulteration, compared with 'street' markets, are reported as key reasons for their use. Most cryptomarket users who completed the Global Drug Survey in 2013 reported “better quality” of substances as a main reason for using cryptomarkets (Barratt et al., 2014), and “concern for street drug quality” and “higher purity” have also been frequently reported in discussion threads in these marketplaces (van Hout & Bingham, 2013). Indeed, many vendors advertise that their products are “lab tested” and claim to have no adulterants or very high quality. It has also been argued that consumer feedback mechanisms available through cryptomarkets would result in a higher quality of products (Aldridge & Décair-Hétu, 2014; Christin, 2013; Martin, 2014).

Since 1999, Spain’s non-governmental organization Energy Control has offered its drug checking service as part of an integrated harm reduction service for recreational drug users. This service analyzes samples from Spanish illegal drug markets which are submitted by users at clubs, venues, rave parties or to Energy Control headquarters. In March 2014, Energy Control launched an International Drug Testing Service (IDTS) advertised only to cryptomarket users. IDTS objectives, procedures, methods and techniques follow the TEDI (Transnational European Drug Information) guidelines and methodology (TEDI, 2012). Preliminary results from the first 8 months of this service have been reported by Caudevilla (2016). In this paper, we present data about purity and adulteration of samples submitted to IDTS in 1-year activity, from March 2014 to March 2015. We also expand the discussion to...
further situate the findings and the limitations of this unique data source.

Methods

The target population were drug consumers who submitted drugs sourced through cryptomarkets. Information about IDTS was offered in two cryptomarkets forums that were operating during the data collection period (Silk Road 2.0 and Evolution Marketplace). The post linked to the IDTS Energy Control web page (http://energycontrol.org/noticias/528-international.html) where detailed information about the IDTS was offered. After submitting samples for analysis, users received a detailed report with drug test results and specific and individualized information oriented to risk reduction. The cost of the service was 50 Euro payable in Bitcoin or through PayPal. These funds were used to cover the costs of providing the service. In order to maintain confidentiality we asked for no personal or socio-demographic data, but stamps and postmarks were used to collect information about the country of origin of the user (note that country of origin of the service user does not necessarily match the country of origin of the sample). Users were asked to report the type of substance they believed they were submitting for analysis.

In the text, the term “purity” refers to the proportion of the active principle present in a sample compared to those of synthesis impurities, residual solvents or diluents. “Adulteration” refers to the addition of a component not ordinarily part of that substance. The identification of the specimens was performed through a combination of different validated analysis techniques. In order to detect the substances, determine purity and check for potentially toxic adulterants, a chromatographic technique was used: gas chromatography associated to mass spectrometry (Giné, Espinosa, & Vilamala, 2014). The purity of LSD was ascertained using liquid chromatography associated with mass spectrometry (Johansen & Jensen, 2005). Both techniques were performed at the Municipal Institute for Medical Research in Barcelona (IMIM–Hospital del Mar).

Results

From March 2014 to March 2015, a total of 219 samples were analyzed. The number of samples analyzed increased over time: March–June 2014 (n = 23), July–September 2014 (n = 50), October–December 2014 (n = 57), January–March 2015 (n = 89). Samples were submitted from Europe (n = 92, 42.0%), Australia (n = 57, 26.0%), United States (n = 46, 21.0%), China (n = 11, 5.0%), Canada (n = 7, 3.2%) and Argentina (n = 6, 2.7%).

In 200 of 219 samples (91.3%), the main result of analysis coincided with the information provided by the user. In the remaining 19 samples, analytical results revealed: (a) another drug than advertised (n = 9), (b) a mixture of unexpected substances (n = 7), or (c) the composition could not be determined with the analytical techniques performed (n = 3).

Table 1 shows test results from most frequently analyzed substances. In 141 of 219 IDTS samples (64.4%), the expected substance was detected without any adulterants. No adulterants were detected in any substance submitted as MDMA, LSD or cannabis. In cocaine samples, levamisole was the most frequently detected adulterant, present in 42.6% (42 of 103) cocaine samples (concentration: 11.7 ± 8.0%; range: 2–43%). Other relevant detected adulterants in cocaine samples were phenacetine 6.8% (7 of 103) (concentration: 28.7 ± 22.4%; range: 4–54%), caffeine 5.8% (6 of 103) (concentration: 7.1 ± 5.7%; r: 0.3–13%), benzocaine 2.9% (3 of 103) (concentration: 25.3 ± 23.2%; range: 4–50%) and lidocaine 2.9% (3 of 103) (concentration: 14.7 ± 8.0%; range: 7–23%). Caffeine was found in 40.0% (4 of 10) of amphetamine (speed) samples (concentration: 26.0 ± 30.8%; range: 9–72%).

Discussion

Cryptomarkets offer a wide variety of products, have system of feedback and rating and are partially controlled by administrators. These characteristics could influence the quality and purity of drugs offered as suggested by predictions of criminologists and economists studying the mechanisms of cryptomarkets (Aldridge & Décary-Hétu, 2014; Christin, 2013; Martin, 2014) and the perceptions of cryptomarket users (Barratt et al., 2014; van Hout & Bingham, 2013).

Some of our data are consistent with current reports and are a reflection of the global market. For example, results for MDMA, with high purities in crystalized form and very elevated dosages of MDMA in tablet form as reported here, have been recently reported by other harm reduction groups offering drug checking services as well (Brunt et al., 2016). Also, frequencies of levamisole contamination in our sample are congruent with this widespread problem reported in the rest of the global drug market (Chang, Osterloh, & Thomas, 2010).

Given broader evidence of the adulteration of conventional drugs with New Psychoactive Substances (NPS), the low frequency of NPS in our cryptomarket samples is noteworthy. Energy Control has previously identified 24 different NPS in 173 samples that were

Table 1

<table>
<thead>
<tr>
<th>Advertised substance</th>
<th>Substance detected</th>
<th>Purity of advertised substance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Only the advertised substance</td>
<td>Advertised substance combined with other substances</td>
</tr>
<tr>
<td>Cocaine</td>
<td>103</td>
<td>51.5% (53/103)</td>
</tr>
<tr>
<td>LSD</td>
<td>15</td>
<td>100.0% (15/15)</td>
</tr>
<tr>
<td>MDMA crystal</td>
<td>13</td>
<td>100.0% (13/13)</td>
</tr>
<tr>
<td>MDMA pills</td>
<td>11</td>
<td>100.0% (11/11)</td>
</tr>
<tr>
<td>Amphetamine</td>
<td>10</td>
<td>40.0% (4/10)</td>
</tr>
<tr>
<td>Ketamine</td>
<td>6</td>
<td>50.0% (3/6)</td>
</tr>
<tr>
<td>Cannabis resin</td>
<td>5</td>
<td>100.0% (5/5)</td>
</tr>
</tbody>
</table>

a Only advertised substances with five or more samples are shown. Other advertised substances analyzed were 5F-PB-22, mephedrone, MDA (n = 4), methamphetamine, alprazolam (n = 3), clonazepam, ephedrine, midazolam, modafinil, mescaline, DMT, 2C-B, 2C-E, butyrfentanyl, DOB, DOET, DOM, DON, DXM, ethylphenidate, flurbiprofen, kratom, methylene, penthedrine, pentobarbital, nimetazepam, 2-MeO-diphenidine, 3-fluoromethamphetamine, acetyl fentanyl, alfa-PVP, benzocaine, scopolamine, ARK-48, XLR-11 (n = 1).

b Purities have been calculated using any sample containing advertised substances (both alone and in combination).
Our service is conceived as a harm reduction tool for drug consumers and not a “quality control guarantee” for vendors. As part of our work in this project, we conducted weekly monitoring of markets and forums during the study (Silk Road 2.0 and Evolution Marketplace) and we did not detect any vendor using our information in this sense. We have been aware in three occasions that some users have started up crowdfunding initiatives to submit samples and publish results (for example see: http://avengerfxkmt2a6.onion/). In these cases, we have asked that the following notice be posted—“the test result is only valid for the submitted sample and it is not a guarantee of vendor or market”— and this has occurred in all cases.

On the whole, the main substances analyzed by IDTS are the same as the ones used in recreational settings: MDMA, amphetamines and cocaine. Each of these substances varies greatly with regard to their levels of purity and their adulterant percentages. For users, this means not only dealing with the risks of the substance but also dealing effectively with the risks associated with its adulterants. Some of the analyzed substances (pentobarbital, acetylfentanyl, butyrfentanyl and scopolamine) and some of the adulterants detected (levamisole and phenacetin) pose a greater overdose risk than better-known substances and expose users to other potentially life-threatening situations (McIntyre, Trochta, Gary, Malamatos, & Lucas, 2015). Our data suggest that the hypothesis of higher purities of substances in crypto markets is plausible but future papers utilizing a larger sample size and comparisons with other sources of information are needed to confirm this. In this complex environment of unregulated supply, the only way to learn about the actual composition of these substances is to have them properly tested by a drug testing service. Furthermore, the introduction of a drug testing service within cryptocurrencies is a powerful tool that engages drug users and promotes healthier practices.

Conflicts of interest

The authors state that there are no conflicts to report.

Acknowledgements

We thank Rafael de la Torre (IMIM-Parc de Salut Mar) for his help in the analysis and interpretation of drug samples. Drug Testing Service is supported by grants from Agència de Salut Pública de Catalunya (Generalitat de Catalunya, Subdirecció general de drogodependències) and Plan Nacional sobre Drogas (Ministerio de Sanidad, Política Social e Igualdad). This paper was written up without specific grant funding. Monica Barratt is supported by a National Health & Medical Research Council Early Career Researcher Fellowship (APP1070140). The National Drug Research Institute in the Faculty of Health Sciences at Curtin University and the National Drug and Alcohol Research Centre at UNSW Australia are supported by funding from the Australian Government under the Substance Misuse Prevention and Service Improvement Grants Fund. M.B. gratefully acknowledges the contribution to this work of the Victorian Operational Infrastructure Support Program received by the Burnet Institute.

References


Please cite this article in press as: Caudevilla, F., et al. Results of an international drug testing service for cryptomarket users. International Journal of Drug Policy (2016), http://dx.doi.org/10.1016/j.drugpo.2016.04.017