Patterns of methamphetamine production among an international sample of methamphetamine 'cooks'

Cheneal Puljević, PhD[1]

Renee Zahnow, PhD[2]

Isabella Benfer[1]

Adam R. Winstock, PhD[3,4]

Larissa J. Maier, PhD[5]

Monica J. Barratt, PhD[6,7]

Jason Ferris, PhD[1]

[1] Centre for Health Services Research, The University of Queensland, Brisbane, Australia

[2] School of Social Science, The University of Queensland, Brisbane, Australia

[3] University College London, Gower St, Bloomsbury, London, UK

[4] Global Drug Survey Ltd, London, UK

[5] Department of Clinical Pharmacology, University of California San Francisco, USA

[6] Social and Global Studies Centre, RMIT University, Melbourne, Vic, Australia

[7] National Drug and Alcohol Research Centre, UNSW Sydney, NSW, Australia

Corresponding author: A/Prof Jason Ferris, Centre for Health Services Research, Faculty of Medicine, The University of Queensland, j.ferris@uq.edu.au, +61 7 3176 5530

ABSTRACT

Introduction: The illicit manufacture of methamphetamine in clandestine laboratories is associated with significant risks to the community and environment. Currently little is known about clandestine laboratories or the individual "cooks" who operate them; current research directly engaging with cooks is limited to three qualitative studies with small samples (n<24) of cooks based in the United States. This descriptive brief report starts to address this knowledge gap by exploring characteristics of an international sample of self-identified methamphetamine cooks.

Methods: Using data from the 2017 and 2018 Global Drug Surveys, we identified 125 individuals from 24 countries who reported past manufacture of methamphetamine. We explored respondents' socio-demographic characteristics and patterns of methamphetamine production using descriptive statistics.

Results: The majority of methamphetamine cooks were male (82%) and Caucasian (70%), and, contrary to previous studies, 43% were employed and 51% had at least a high school certificate. Cooks most commonly sourced precursors from pharmacies (50%), followed by friends (24%). Almost half of the cooks (47%) produced methamphetamine exclusively for self-consumption.

Discussion: The heterogeneous nature of the sample, and varying precursor sources, reflect the limitations of existing regulations aimed at limiting methamphetamine production. These findings point to the need for innovative and multi-faceted efforts aimed at reducing and preventing the harms associated with methamphetamine manufacture.

INTRODUCTION

Methamphetamine is a highly addictive substance [1] that can be manufactured with relative ease in small domestic laboratories [2]. Recent global trends in drug seizures suggest a dynamic and growing market for methamphetamine in a number of countries [3]. Analyses of wastewater conducted in 37 countries between 2011 and 2017 show the highest levels of methamphetamine use in the USA, followed by Australia and New Zealand [4]. Methamphetamine is typically produced in clandestine laboratories (commonly referred to as clan labs) of varying sizes, ranging from "super" clan labs, which are large, organised labs capable of producing an average of 10 pounds (4.5kgs) per cycle, to smaller labs based in domestic residences that supply individual consumption [2]. Domestic clan labs were recently made infamous by the television series *Breaking Bad*. However, the television series failed to highlight the significant health risks clandestine laboratories pose to individuals and communities. As these clan labs involve the use of volatile and hazardous chemicals, often processed through makeshift equipment [5], fires and explosions can occur, causing significant injuries [6]. Further, the cooking process can result in the release of harmful reagents and by-products into the atmosphere, water and soil [7], posing significant public health risk to the environment and to the people who come into contact with clan labs.

The majority of people receiving injuries from clan labs are the individuals manufacturing the drugs [8], with common injuries including acute inhalation injuries, burns, or death following explosions [8, 9]. These manufacturers often follow "recipes" found online, earning them the nickname of "cooks" [10, 11]. As most clan labs are located in residential neighbourhoods [8], members of the public, including children, are also occasionally victim to chemical exposure associated with nearby clan labs [7, 9]. Clan labs are a public safety issue separate from individual drug use in the risks posed to the general non-using population [9], pointing to the need for effective strategies aiming to prevent this kind of methamphetamine production.

Due to difficulties engaging this population group in research, very little is known about cooks or their production methods; for example, we are aware of only three studies, all conducted in the USA—Missouri [12], Arkansas [13], Kentucky [13], and Oklahoma [14]—which have engaged directly with small samples (n<24) of current [13] or former [12, 14] producers of methamphetamine. Other research examining methamphetamine manufacturers typically describes small samples (n<32) of cooks identified through retrospective reviews of

administrative records [15-17]. All studies describe cooks as characteristically young, male, Caucasian and unemployed, with low levels of education [12-17].

Information about cooks' production methods can inform prevention, intervention and harm reduction strategies, particularly those targeting the availability of precursors or tools used for manufacturing. Further, information about their demographic profiles may help to identify individuals at high risk of future methamphetamine manufacture, thus enabling prevention through early intervention. The current study starts to address some of these research needs. Drawing on survey data from a sample of 125 people who identified as methamphetamine cooks, this descriptive brief report explores patterns of methamphetamine production among this unique population.

METHODS

Data source

Data were drawn from the Global Drug Survey (GDS) [18], an annual, anonymous, online survey conducted in partnership with global media partners that captures respondents' lifetime and recent use of more than 150 drugs. The survey is open to anyone aged 16 and over who consents to participate, and is translated into multiple languages. Full details of the design, history and representativeness of the GDS are described elsewhere [18]. The study received ethical approval from University College London (11671/001), King's College London (PNM/14/15-17), The University of Queensland (2017001452/11671/001), and The University of New South Wales (HC17769).

Combined data from the 2017 and 2018 GDS were used for this study. A total of 119,108 and 130,761 people responded to the 2017 and 2018 GDS respectively. The sample described in this study was restricted to those who responded "yes" to the question "Have you ever made your own methamphetamine drugs?" For individuals who reported participating in both the 2017 and 2018 GDS surveys, we retained only their responses from the 2017 survey to avoid duplication.

Analyses

First we calculated descriptive statistics for socio-demographic variables, including sex, age, country of residence, geographic location (city/urban, regional or remote), educational achievement, employment status, current occupation, and drug use within the past year. Next we analysed their patterns of methamphetamine production, including common production methods, frequency of production, source of precursors, and the purpose

of the manufactured methamphetamine (self-consumption / sale to others). Finally, we compared cooks who manufactured methamphetamine for self-consumption, for sale to others, or both.

RESULTS

The final sample of methamphetamine cooks included 125 respondents (66 from GDS 2017 and 59 from GDS 2018) from 24 countries. Table 1 shows the socio-demographic profile of the sample. The majority were male and Caucasian, and the cooks reported a mean age of 30 (range 16-60). The largest number of the sample's respondents resided in the USA (38%), followed by Australia (10%), New Zealand (9%), Germany (7%), and Canada (6%). One-third of respondents had a high school certificate, and almost half were currently employed, with the most frequently reported occupation being a labourer or related profession. Respondents reported a high level of substance use in the past 30 days, in particular tobacco, methamphetamine, cannabis mixed with tobacco, and amphetamine.

Table 2 shows respondents' patterns of methamphetamine production for the full sample and for respondents from the five countries with the highest numbers of cooks. Approximately one-third of cooks had produced methamphetamine at least once within the past year. The most commonly-reported production method was using ephedrine/ pseudoephedrine as a precursor, followed by a reduction of hydroiodic acid and red phosphorous, although these processes often form two parts of the same method. Pharmacies were the most common source of precursors, followed by friends. Almost half of respondents described manufacturing methamphetamine for self-consumption only.

Supplementary Table 3 shows the socio-demographic characteristics of respondents who reported manufacturing methamphetamine for self-consumption, for sale to others, or both. Although small sample sizes in each group and missing data limit our ability to draw accurate comparisons between the groups, those who reported manufacturing exclusively for self-consumption appear to be similar in age, ethnicity, level of education and employment status compared to the overall sample and those who manufacture for both self-consumption and sale to others.

DISCUSSION

Our analyses of an international sample of self-identified methamphetamine cooks provides new information about individuals involved in methamphetamine manufacture. Our findings show that methamphetamine cooks are heterogeneous in both their socio-

139 demographic characteristics and their adopted method of methamphetamine synthesis. Here
140 we report two key findings that add to the current literature.

141 First, in contrast to previous single-region studies describe methamphetamine cooks
142 as characteristically unemployed, and with limited education [12-17], our sample contains
143 individuals representing a wider range of socio-demographic characteristics. The majority of
144 individuals in our sample had completed high school and were employed and many were in
145 professional or managerial roles. This finding implies that clandestine laboratories may exist
146 in many types of neighbourhoods, including higher socioeconomic areas.

147 Our second key finding is that respondents most commonly described manufacturing
148 methamphetamine for self-consumption only, suggesting small-scale manufacture within
149 domestic residences, while only a small percentage of respondents reported manufacturing
150 methamphetamine exclusively for sale to others. This finding reflects those from literature
151 describing cannabis cultivators primarily growing cannabis for personal use [19, 20],
152 although the cultivation of cannabis is arguably less risky in terms of risk of exposure to
153 hazardous chemicals or explosions. Domestic production of methamphetamine is of
154 particular concern when considering the public health harms associated with clan labs located
155 in residential areas, such as fires and explosions [7, 11], or exposure of members of the public
156 to hazardous chemicals [7, 9, 11]. Further, the sporadic and diverse nature of this type of
157 manufacture makes it particularly difficult to locate and prevent [2]. In addition to the
158 provision of traditional drug education and treatment services aimed at reducing demand for
159 methamphetamine [1, 2], there may be benefit in training third parties who have routine
160 access to residences (such as realtors or cleaners) to detect and report suspicious activity
161 related to methamphetamine manufacture.

162 A number of legislative controls have been implemented internationally in an attempt
163 to prevent methamphetamine manufacture (see Stoneberg et al for a review [2]), such as
164 limits on the sales and supply of precursors required for methamphetamine production [21,
165 22]. While these regulations have previously demonstrated effectiveness in reducing
166 indicators of methamphetamine supply [21-23], many cooks are now able to synthesise
167 precursors from processed products [10], and international efforts to disrupt illicit drug
168 supply, trafficking and manufacture have met with limited success [2]. These regulations also
169 may be less effective in preventing methamphetamine manufacture by cooks producing
170 methamphetamine exclusively for individual consumption. As a consequence, our results

171 provide support for innovative and multi-pronged approaches to prevent unregulated
172 methamphetamine manufacture and related harms, such as exposure to harmful chemicals, or
173 injuries from fires or explosions. There also may be merit in considering targeted outreach
174 approaches (for example, campaigns promoting less risky methods of cooking), or even the
175 safe supply of methamphetamine within a legal, regulated context— an approach with the
176 potential to reduce harms among a group who often experience various forms of disadvantage
177 and marginalisation [24, 25]. Given many cooks indicate manufacturing only for self-
178 consumption, these strategies may also reduce potential community harms associated with
179 small-scale methamphetamine manufacture. Further research is also required on this topic, in
180 particular regarding motivations for methamphetamine production, whether there is any
181 significant difference between purchased and produced product in terms of perceived quality
182 or value for money, and effective interventions or strategies to prevent unregulated
183 methamphetamine manufacture and related harms.

184 Our study benefits from its unique international sample and the GDS survey's
185 anonymity, and highlights that people who manufacture methamphetamine, for personal use
186 or supply, are prepared to complete online surveys about their manufacturing practices.
187 However, our findings are subject to some limitations. First, our data are not necessarily
188 representative of individuals who manufacture methamphetamine; the GDS is a self-select,
189 self-report survey, and only included individuals who had used a drug within the past 12
190 months. As a result of this and the sample size, analyses were restricted to descriptive
191 statistics. In addition, ethical considerations necessitated designing the questions as optional
192 to complete, resulting in missing data. Third, participants were limited to three response
193 options when describing the purpose of methamphetamine production (self-consumption, sale
194 for others, or both), excluding those who may have manufactured methamphetamine for
195 social supply or other purposes. Finally, we are unable to provide details about the context
196 within which individuals manufactured methamphetamine (e.g. the clan lab's size or
197 location), or respondents' motivations behind production.

198 **Conclusions**

199 In this study we highlighted two key findings: many individuals who manufacture
200 methamphetamine are employed and have finished high school, and almost half of cooks
201 reported manufacture for self-consumption only. While our study provides some unique
202 insights into the characteristics and behaviours of methamphetamine cooks, more research is

203 required to inform policies aimed at both prevention of and intervention in methamphetamine
204 manufacture, and the potential impact of the safe supply of methamphetamine.

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