International Journal of Drug Policy 26 (2015) 461–467

Contents lists available at ScienceDirect

International Journal of Drug Policy

journal homepage: www.elsevier.com/locate/drugpo

Research paper

Mortality related to novel psychoactive substances in Scotland, 2012: An exploratory study

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ARTICLE INFO

Article history:
Received 15 August 2014
Received in revised form 28 October 2014
Accepted 30 October 2014

Keywords:
Novel psychoactive substances
Drugs
Mortality
Overdose

ABSTRACT

Background: The growth of novel psychoactive substances (NPS) over the last decade, both in terms of availability and consumption, is of increasing public health concern. Despite recent increases in related mortality, the circumstances surrounding and characteristics of individuals involved in NPS deaths at a population level remain relatively unknown.

Methods: The Scottish National Drug Related Death Database (NDRDD) collects a wide-range of data relating to the nature and circumstances of individuals who have died a drug-related death (DRD). We conducted exploratory descriptive analysis of DRDs involving NPS recorded by the NDRDD in 2012. Statistical testing of differences between sub-groups was also conducted where appropriate.

Results: In 2012, we found 36 DRDs in Scotland to have NPS recorded within post-mortem toxicology. However, in only 23 of these cases were NPS deemed by the reporting pathologist to be implicated in the actual cause of death. The majority of NPS-implicated DRDs involved Benzodiazepine-type drugs (13), mainly Phenazepam (12). The remaining 10 NPS-implicated deaths featured a range of different Stimulant-type drugs. The majority of these NPS-implicated deaths involved males and consumption of more than one drug was recorded by toxicology in all except one case.

NPS-implicated deaths involving Benzodiazepine-type NPS drugs appeared to involve older individuals known to be using drugs for a considerable period of time, many of whom had been in prison at some point in their lives. They also typically involved combinations of opioids and benzodiazepines; no stimulant drugs were co-implicated.

Deaths where stimulant-type NPS drugs were implicated appeared to be a younger group in comparison, all consuming two or more Stimulant-type drugs in combination.

Conclusion: This exploratory study provides an important insight into the circumstances surrounding and characteristics of individuals involved in NPS deaths at a population level. It identifies important issues for policy and practice, not least the prominent role of unlicensed benzodiazepines in drug-related mortality, but also the need for a range of harm reduction strategies to prevent future deaths.

Introduction

Although not a new phenomenon, the growth of novel psychoactive substances (NPS) over the last decade, both in terms of availability and consumption, is of increasing public health concern. The number of new NPS reported to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) has increased year on year from 24 in 2009 to 81 in 2013 with over 350 substances now being monitored (EMCDDA, 2014). In addition, the United Nations Office on Drugs and Crime (UNODC) estimates that a total of 348 NPS had been identified by member states by mid-2013 (UNODC, 2014).

The scale of NPS use globally is less clear due to an absence of epidemiological data from robust population-based samples and only limited data from a few countries on specific substances and sub-populations (UNODC, 2013a). Moreover, a lack of common

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http://dx.doi.org/10.1016/j.drugpo.2014.10.010
0955-3959/

definitions, the large and increasing number and classes of substances regarded as NPS, and differences in legislation further complicate the ability to accurately understand use within and across countries.

As with prevalence, there is a dearth of evidence on NPS-related harm. Most research to date on NPS-related harms is in relation to fatal poisonings and limited to deaths involving specific drugs (Corkery, Schifano, & Ghodse, 2012a) or individual case-studies (Maskell, De Paoli, Seneviratne, & Pounder, 2011). However, to our knowledge, there have been no published studies to date on population based cohorts of NPS-related death which describe, in detail, the characteristics of the individuals involved and the circumstances surrounding their deaths. Thus, the aim of this study was to provide an exploratory descriptive account of drug-related deaths (DRDs) involving NPS recorded by the Scottish National Drug Related Death Database (NDRDD) in 2012, including consideration of cases where NPS drugs are recorded within toxicology and a particular focus on cases where NPS drugs were deemed to be implicated in the cause of death.

Methods

The UN categorises the current NPS market into six main groups of drugs: synthetic cannabinoids; synthetic cathinones; ketamine; phenethylamines; piperazines; plant-based substances; and a group of miscellaneous substances that contain recently identified NPS (e.g. tryptamines) that do not fit into any of these groups (UNODC, 2013b). Other pharmaceutical medications not licensed for use within the UK, for example benzodiazepines such as Phenazepam, have also been included within the broad definition of NPS by the UK Advisory Council on the Misuse of Drugs (ACMD) (ACMD, 2011) and the UK National Programme on Substance Abuse Deaths (Corkery, Claridge, Loi, Goodair, & Schifano, 2014).

The NDRDD adopts the same definition as used by National Records of Scotland (2013) when including NPS within the dataset: "*The term 'New Psychoactive Substances' (NPS) is meant to cover the kinds of substances that people have, in recent years, begun to use for intoxicating purposes. NPS include so-called 'legal highs' (by which is meant substances which were legally available at the time of the death, whether or not they have since become controlled). In general, when an NPS first became available, it would not have been a controlled substance under the Misuse of Drugs Act 1971. Some NPS may still not be controlled under the Act. The definition of NPS therefore includes current so-called 'legal highs', and also substances which used to be described as 'legal highs' but are now controlled.*"

NDRDD criteria for counting NPS-related deaths

Inclusion and exclusion criteria for counting statistics on NPS-related deaths in a given year (here 2012) can be categorised in three ways:

- NPSs which were already controlled substances at the start of 2012;
- NPSs which became controlled substances during 2012 (i.e. whose classification changed during the period covered by these figures for deaths involving NPS); and
- NPSs which were not controlled substances at the end of 2012 (some of which have since become controlled substances).

NRS criteria for counting NPS-related deaths

A death due solely to one of these drugs would be counted in the NRS National Statistics publication of drug-related deaths if the person died on or after the specified date that the drug became controlled. A death due solely to one of these NPS drugs would not be counted in NRS National Statistics on drug-related death (DRD) if it involved a drug that were not controlled at the time at the time of death.

NRS also provides additional information about whether the drugs recorded in toxicology were implicated in the death or not. This is based on pathologist reports which accompany the majority of DRDs. In the absence of such information NRS assumes all drugs mentioned on the death certificate were implicated in the death.

It is also important to note that NRS National Statistics are based on the date the death is registered rather than the date on which the person died. In Scotland, the numbers reported in a year are effectively the same because all deaths must be registered within eight days of death having been ascertained, without exception. In England and Wales, there tends to be a delay between the date of death and the date of registration because all sudden deaths are referred to the Coroner and are not registered until they have been reported, This potentially leads to a lower number of deaths being registered in the latest reported year for deaths occurring in that year.

The Scottish NDRDD is notified of DRDs from local data coordinators. Cases are then matched against those reported by NRS. The two datasets have become closely matched over time (only 7% of NRS recorded DRDs were missing from NDRDD returns in 2012). The NDRDD therefore reports on a subset of DRDs in Scotland and is therefore not a National Statistics output for Scotland (which is provided by NRS) but a descriptive account of a cohort of deaths where further information was available.

Data on all deaths recorded in 2012 were obtained from the Scottish NDRDD, entered into a secure database, anonymised and analysed descriptively using SPSS v21. The Scottish NDRDD collects a wide-range of variables relating to the nature and circumstances of individuals who have died a DRD including their sociodemographics, drug use history, toxicology, known service contact and medical and psychiatric details (Hecht, Barnsdale, & McAuley, 2014). The overall sample was divided into two cohorts; those with NPS recorded in toxicology (36) (i.e. 'NPS-related') and those where NPS was deemed by the reporting pathologist to be implicated in the cause of death (23) (i.e. NPS-implicated). Six different NPS types were recorded in toxicology across 36 deaths (benzodiazeoines, tryptamines, phenethylamines, piperazines, cathinones, arylalkylamines) which largely fell into two main pharmacological groups; 'Benzodiazepine-type' or 'Stimulant-type' NPS.

This analysis briefly compares the toxicology of both cohorts before focussing in detail on the NPS-implicated cases, investigating the characteristics of the individuals involved and the circumstances surrounding their deaths. The decision to focus on the 23 NPS-implicated rather than all 36 NPS-related was taken on the basis that this group are the most likely to reflect actual cases where NPS has played a part in an individual death, as defined by the reporting pathologist.

In addition to this descriptive analysis, exploratory analyses of differences in findings between the two pharmacological subgroups (i.e. 'Benzodiazepine-type' and 'Stimulant-type') NPS were conducted using Fisher's exact tests (Fisher, 1954).

Results

Toxicology

Table 1 details the drugs recorded and implicated in NPS deaths. The majority of NPS-related DRDs involved Benzodiazepine-type drugs (24), mainly Phenazepam (23). The other 12 NPS-related deaths featured a range of different Stimulant-type drugs. A similar breakdown is evident in the NPS-implicated cases where 12