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Escalation of methamphetamine-related crime and fatalities in the Dresden region, Germany, between 2005 and 2011

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ABSTRACT

Methamphetamine (MA), a central nervous system stimulating recreational drug, is a worldwide problem related to crime as well as forensic and health aspects.

The data, exemplarily presented in this study for the Dresden region, Saxony, Germany, demonstrate the escalation of MA-related crime and fatalities between 2005 and 2011.

Easy availability and an attractive price of MA in the Czech Republic are responsible for both the increase of the occurrence of MA in relation to the entire drug crime as well as the increase of the occurrence of MA-positive cases of driving under influence (DUI).

Higher percentage of very pure MA on the Saxon drug market since 2010 seems to be the reason for the fatalities directly caused by MA in 2010 and 2011.

1. Introduction

Methamphetamine (MA), a central nervous system (CNS) stimulating recreational drug, is a worldwide problem related to crime as well as forensic and health aspects. MA is commonly administered by smoking, insufflation, ingestion or by injection. The use of MA produces a rapid rush and enhances alertness, concentration, energy, euphoria and libido and causes both acute and chronic effects on brain function. Further acute effects are myocardial infarction, malignant hyperthermia, stroke, seizures, rhabdomyolysis, cardiomyopathy, psychosis, and death. Chronic effects become visible in neurologic and psychiatric symptoms as well as in physical changes such as hyperactivity, dilated pupils, and restlessness [1–10].

Currently known as "speed", "crystal", "crank", and "ice" MA was first synthesized in the late 19th century and came commercially on the market in the 1930s. In the second part of the 1990s a global trend toward the escalation of amphetamine-type stimulants, including methamphetamine, was observed [8,11].

MA is popular because it is available, well-priced and relatively easy to synthesize from chemicals like ephedrine and pseudoephedrine which are reduced using various acids or catalysts, e.g. by the "cold" method using red phosphorous and iodine crystals [1,5,11–13]. MA crystals with purities of more than 95% are reported by Kuwayama et al. in Japan and Thailand [14].

While MA abuse is a major issue in North America (U.S.A., Canada, Mexiko), Southeast and East Asia as well as Australia studies from several European countries (Netherlands, Switzerland, United Kingdom, Czech Republic, Slovakia, Poland) show a different picture. With the exception of the Czech and Slovak Republic, where "pervitin", the name given to MA in Czech Republic, is most frequently used and already produced in home laboratories before 1989, a low prevalence of MA abuse is reported in most Europe [6,11,13,15–21].

MA-related fatalities are reported from some countries starting in the 1980s. Deaths are predominantly unintended and associated with blood concentrations greater than 0.50 μg/ml [1,2,22–26].

In contrast to former studies [11] methamphetamine abuse has been developed to a serious issue for some parts of Germany, in particular Bavaria and Saxony, which both border to the Czech Republic.

Exemplarily for the Dresden region, Saxony, Germany, this paper demonstrates an escalation of methamphetamine-related crime and fatalities between 2005 and 2011.

Dresden is one of three administrative regions of the Free State of Saxony in Germany. In 2010 about 1.62 m inhabitants live in an area of 7931 km^2 [27]. Dresden region is located in the eastern part of Germany, bordering to Poland and the Czech Republic.

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Table 1
Methamphetamine in DUI cases and post-mortem cases in the Dresden region between 2005 and 2011.

	2005	2006	2007	2008	2009	2010	2011	Total
Drug-positive DUI cases	1071	795	691	578	573	620	842	5170
MA-positive DUI cases	577	425	370	274	341	464	697	3148
MA-positive DUI cases (%)	53.8	53.4	53.5	47.4	59.5	74.8	82.7	
Post-mortem cases	0	0	0	0	1	4	3	8

DUI, driving under influence; MA, methamphetamine.

2. Materials and methods

The Crime Survey of the State Bureau of Criminal Investigation, Saxony, Dresden, was evaluated for the drug-related crime data between 2005 and 2011 [28].

Blood samples from suspected impaired drivers were obtained by the police of Saxony and analyzed at the toxicological unit of the Institute of Legal Medicine in Dresden. Data between 2005 and 2011 were included in the study if the presence of methamphetamine was demonstrated at a concentration of 0.025 μg/ml or higher.

Post-mortem blood samples were obtained in our institute during autopsy and analyzed afterwards. Toxicological results of a 7-year period between 2005 and 2011 were analyzed retrospectively including the circumstances of death. The autopsy and toxicological results were only used in cases in which methamphetamine directly caused or contributed to the death were involved in the study.

Amphetamines were identified and quantified in femoral blood samples using gas chromatography with mass spectrometric detection (GC–MS) after liquid–liquid extraction and acetylation with 4-dimethylaminopyridine (DMAP) and acetic anhydride. A limit of determination (LOD) of 0.010 μg/ml for amphetamine and methamphetamine, respectively, arised from method validation.

A total of 1480 seizures by Saxony police and customs authorities representing 29.3 kg of MA were analyzed at the State Bureau of Criminal Investigation, Saxony, Dresden, between 2005 and 2011. There was no relation between the quantity of seizure and their MA content.

The methamphetamine content of the crystalline samples was determined as follows:

After homogenization of the sample a mixture of chloroform and pyridine (2:1 v/v) was added. After treating in an ultrasonic bath the eluate solution was acetylated with N-methyl-bis-trifluoroacetamide (MBTFA) and analyzed using gas chromatography with flame ionization detection (GC/FID).

Classes were defined for the evaluation of the methamphetamine purity.

3. Results and discussion

Occurrence of methamphetamine in relation to the entire drug crime in Saxony between 2005 and 2011 is shown in Fig. 1. In the statistics of drug-related crime of the State Bureau of Criminal Investigation of Saxony all substances listed of the German Narcotic Law [29] were registered.

Obviously, there is a gradual increase of methamphetamine: levels slightly below 20% in 2005 and 2006, a plateau stage of 25–27% from 2007 to 2009, and a sharp increase of 10% in 2010 and 2011, respectively, reaching a top level of 45% in 2011 (Fig. 1).

Table 1 gives an overview of findings of methamphetamine in driving under influence (DUI) cases as well as in post-mortem cases obtained in the Dresden region between 2005 and 2011. In addition, in Table 1 total quantity of drug-positive DUI cases (amphetamines, cannabinoids, cocaine, and opiates) is compared with quantity of MA-positive DUI cases.

In summary, MA was present in 3148 cases of overall 5170 drug positive DUI cases (Table 1). Total DUI cases decrease from 2005 to 2009 reaching a minimum of about 570 cases in 2008 and 2009, respectively. Thereafter, total DUI cases increased up to 842 cases in 2011. The total MA DUI cases show a similar curve shape with a minimum in 2008 and a subsequent sharp increase to the top level of 697 cases in 2011 (Table 1).

However, relationship between the MA-positive DUI cases vs. total drug-positive DUI cases is most suitable to demonstrate the general situation. Occurrence of MA is nearly constant at app. 53% from 2005 to 2009, including a minimum in 2008 (47.4%), and a maximum of 59.5% in 2009. Remarkably, data presented in Table 1 indicate increases of 15% (2009–2010) and 8% (2010–2011) up to the top level of 82.7% of MA-positive DUI cases in 2011.

Comparable Dutch and Danish studies reported 0.6% of MA-positive DUI cases vs. the amphetamine-based DUI cases between

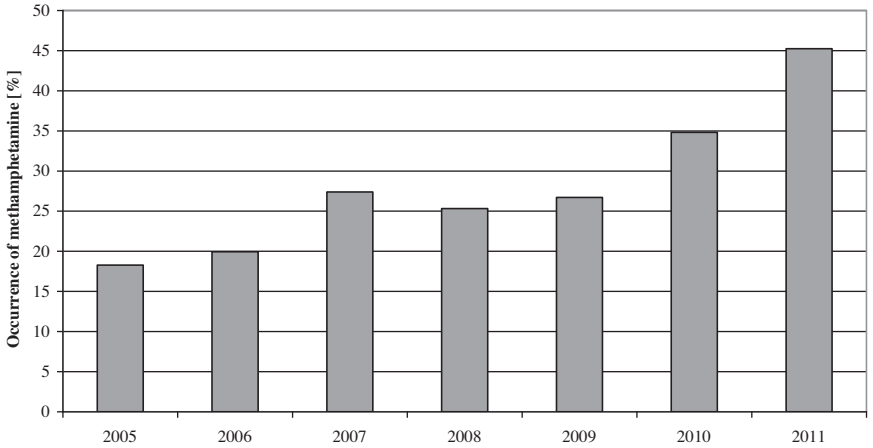

Fig. 1. Occurrence of methamphetamine in relation to the entire drug crime in Saxony (2005–2011).