

Ecstasy Deaths in the State of Florida: A Post-Mortem Analysis

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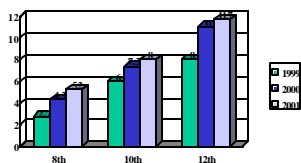
Introduction:

Methylenedioxymethamphetamine (MDMA, Ecstasy) use has been increasing among American teens (See Graph). MDMA has been called a new epidemic because of the acceleration in the number of users in middle and high school and college, and the fact that more MDMA pills have been interdicted by U.S. Customs, the price per pill has been dropping, and presentations to clinical treatment facilities have been increasing. MDMA use has been linked to hepato- and neurotoxic effects and a long list of other medical, neurological, psychiatric and behavioral changes. While many of MDMA's effects are short-term, other effects such as memory disorders are reported to persist for months or years². One consequence of MDMA use is emergency room presentation, crisis and death. MDMA-related emergency room visits have dramatically increased as reported by the DAWN network. Deaths due to MDMA have also increased dramatically. However, the true extent of MDMA increases in emergency room visits has been compromised by a lack of sensitive and specific MDMA laboratory testing.

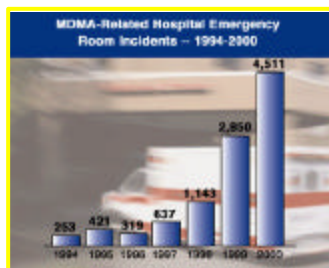


Monitoring the Future Survey

Lifetime MDMA Use 8th, 10th and 12th Graders



UMMIDA 2001



Methods:

In 2000, the State of Florida had an episode of 7 deaths of young people who had reportedly self-administered Ecstasy. Post-mortem analysis by gas chromatography-mass spectrometry performed by one of the authors and other medical examiner labs indicated that these deaths were caused by paramethoxyamphetamine (PMA) which has structural and pharmacological similarities to MDMA. Further, during the period of July-December 2000, a total of 66 medical examiner cases tested positive for a variety of phenethylamines². PMA, however, is more potent than MDMA in its effects, especially on the serotonergic systems. Euphoria and agitation with bruxism, followed by hyperthermia, convulsions and hemorrhage, were observed in these young people. PMA is not a metabolite or contaminant of MDMA, and some of these cases had no measurable MDMA in their blood.

MDMA is commonly detected in our laboratory. A brief summary and relevant toxicological findings of cases from 2001 are presented in the following table.

Results and Conclusions:

In 2001, the majority of MDMA-positive cases involved multiple drugs and were predominate among white males. MDMA is not approved for use in clinical medicine and is not manufactured by any pharmaceutical company. Pills purported to be Ecstasy are often not simply MDMA, but contain other compounds such as various phenethylamines. MDMA toxicity appears to be increased by concurrent unknowing ingestion of other drugs, which increases the risk for an adverse medical event. The diagnosis of MDMA-related deaths is important. In Florida, identification of deaths due to MDMA allowed a sharing of information among medical examiners and others which led to the identification of a "Mitsubishi brand" as the culpable pill containing PMA preventing many additional deaths. Dissemination of these facts caused an end to this tragic episode.

Toxicological Findings in MDMA-Positive Cases from 2001

Case #	Age	Sex	Race	Brief History	Post-Mortem Toxicological Findings		
					Blood	Urine	
1	45	F	W	MVA - passenger	Ethanol: 92 mg/dL Benzoyllecgonine: 54 ng/mL	Diazepam: 164 ng/mL Nordiazepam positive (trace) MDMA positive (trace)	Ethanol Benzoyllecgonine Nordiazepam MDMA
2	43	M	W	Found dead in hotel room	Ethanol: 81 mg/dL Acetaminophen: <10 mg/L	Hydrocodone: <50 ng/mL MDMA: 7.6 ng/L	Ethanol Acetaminophen MDA MDMA Hydrocodone
3	21	M	W	Apparent drug overdose	Benzoyllecgonine: 1067 ng/mL	MDMA: 0.5 mg/L Oxycodone positive (trace)	Cannabidiols Cocaine Cocacetylchone Benzoyllecgonine Diphenhydramine MDMA Oxycodone Tramadol Tramadol Mts.
4	24	M	W	Found dead; possible alcohol/drug overdose	Ethanol: 890 mg/mL Cocaine (trace) Cocacetylchone (trace)	Benzoyllecgonine: 884 ng/mL MDMA: 1.0 ng/L	Ethanol Cannabidiols Cocaine Cocacetylchone Benzoyllecgonine Ephedrine/PE GHB MDMA MDA MDEA
5	23	M	W	MVA - passenger	Ethanol: 149 mg/dL MDMA: <0.5 ng/L	Cannabidiols	Ethanol Cannabidiols Methamphetamine MDA
6	23	M	W	Apparent drug overdose; history of heroin abuse	Alprazolam: 32 ng/mL Ephedrine/PE MDMA: <0.5 ng/L Morphine (free): <50 ng/mL	Morphine (total): 194 ng/mL Tramadol positive	Alprazolam Mts. Ephedrine/PE Methadone Meprobolol MDMA MDA Morphine 6-Acetylmeperidine Tramadol Mts.
7	17	M	W	MVA - passenger	Ethanol: 40 mg/mL MDMA: <0.5 mg/L	Cannabidiols	Ethanol Cannabidiols MDMA MDA
8	24	M	B	Homicide	No drugs detected	Benzoyllecgonine MDMA	Benzoyllecgonine MDMA
9	30	M	B	Seizure and apnea at bar; history of "Ecstasy" use	MDMA: 2.9 mg/L MDA (trace)		Ethanol MDMA MDA
10	22	M	W	Apparent drug overdose	Alprazolam (trace) MDMA (trace) Oxycodone: 329 ng/mL		Alprazolam Mts. Chlorthalidone Ephedrine/PE MDMA MDA Methadone PPA
11	20	M	B	Struck in chest and collapsed	Ethanol: 30 mg/dL MDMA (trace)		Ethanol Benzoyllecgonine Cannabidiols MDMA MDA
12	31	M	W	Apparent drug overdose	Alprazolam: 10 ng/mL Benzoyllecgonine: 1835 ng/mL Diazepam: 122 ng/mL	Nordiazepam: 116 ng/mL Oxycodone: 308 ng/mL	Acetaminophen Cannabidiols Cocaine Nordiazepam Benzoyllecgonine Hydrocodone Propofol Oxycodone
13	25	M	W	Apparent drug overdose	MDMA: 2.0 mg/L		Cannabidiols MDMA MDA PMA Oxycodone
14	28	M	W	Apparent drug overdose	Ethanol: 13 mg/mL MDMA: 2.0 mg/L MDA (trace) Oxycodone: 518 ng/mL		Ethanol Chlorthalidone Ephedrine/PE MDMA Oxycodone
15	36	F	W	MVA - driver	Ethanol: 161 mg/dL Benzoyllecgonine: 284 ng/mL MDMA: 0.9 ng/L		Ethanol Benzoyllecgonine Methamphetamine
16	30	M	W	Apparent drug overdose	Gabapentin positive Oxycodone: 174 ng/mL		Ephedrine/PE Gabapentin MDMA MDA Oxycodone Propylthiouracil
17	38	F	W	MVA	MDMA: <0.5 mg/L		Ethanol Benzoyllecgonine Methamphetamine MDMA MDA
18	18	F	W	Apparent drug overdose	Acetaminophen: 107 mg/L Alprazolam: 14 ng/mL MDMA: 0.7 mg/L Propoxyphene: 1.6 mg/L Nortopropesene: 2.1 mg/L		Ethanol Acetaminophen Alprazolam Mts. Benzoyllecgonine Hydrocodone MDMA MDA Propoxyphene Nortopropesene
19	27	F	W	MVA - driver	Ethanol: 18 mg/dL MDMA: 1.0 mg/L		Ethanol MDMA MDA
20	22	M	W	Found dead at home following evening of partying	Acetone (trace) Alprazolam: 19 ng/mL Cocaine: <50 ng/mL Benzoyllecgonine: 1820 ng/mL MDMA: <0.5 mg/L		Acetone Acetaminophen Ephedrine/PE Methadone Methadone Mts. Cocaine MDMA MDA
21	33	F	W	Apparent drug overdose	Alprazolam: 57 ng/mL Methadone (trace) Methamphetamine (trace) MDMA: 0.6 mg/L Sertaline Desmethylsertraline		Ethanol Alprazolam Mts. Methamphetamine Methadone Methadone Mts. Sertaline Desmethylsertraline Methamphetamine MDMA MDA Methadone MDA

References:

- Gold MS, Tabrah H, Frost-Pineda K. Psychopharmacology of MDMA. Psych Annals. 31:11; 675-681, 2001.
- Report of Drugs Identified in Deceased Persons by Florida Medical Examiners, Florida Department of Law Enforcement (2000).