The Incidence of Drug Abuse in Unnatural Deaths in Northern Thailand

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Objective: *Study the incidence of drug abuse in persons with unnatural deaths such as traffic accidents, homicide with gunshot wounds, etc.*

Material and Method: *One hundred and fifty three cases with a mean age of 34 years (range 10 to 76) were studied. The decedents were mostly male (92%), with a variety of occupations including laborers (76.9%), traders (15.4%), and student(7.7%). The causes of death were mainly traffic injuries (33%), gunshot wounds (26%) and others (stab wound, poisoning, asphyxia etc 41%). The manner of death was accidents in 40% and homicides in 28%.*

Results: *Nine percent were positive for methamphetamine or amphetamine derivatives. Tests for Heroin, 6-MAM, morphine, or cocaine were also performed but not detected. The drug positive cases were mostly males (85%) with the most common age range of 21-30 years (35.4%) and 61% with only primary education. Homicide by gunshot wounds was the most common cause of death at 69.2%, followed by hanging (15.4%), electrocution (7.7%), and poisoning (7.7%). The concentration of methamphetamine in urine was between 501 - 61,147 ng/ml, which cannot be correlated with intoxication. There were no deaths from overdose. Three Benzodiazepine, one toluene, and one meperidine cases were also found in cases of methamphetamine abuse. Alcohol was found mostly in the persons with unnatural deaths (53.6%) from traffic accidents.*

Conclusion: *This information helps us understand the marketing strategies, and the trading routes. All data will be used for planning to eradicate these drugs from Thailand in line with government strategies.*

Keyword: *Drugs of abuse, Amphetamines, Toluene, Heroin, Northern Thailand*

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At present, there are many drug addicts in Thailand, especially in large cities such as Bangkok, Chiang Mai, and Phuket[1]. The preferred drugs used are as heroin, methamphetamine, Ecstasy, opium, marijuana, Mitragyna Speciosa, toluene, cocaine, codeine. Although the government has tried to control this problem by enforcing the laws, many difficulties still exist[2]. At present, amphetamine, methamphetamine, MDMA (methylenedioxymethamphetamine or Ecstasy), and MDA (methylenedioxyamphetamine or love drug) are causing the most serious problems in Thailand[3]. Other serious areas of concern include use of CNS depressants such as heroin, opium, marijuana, toluene, and alcohol. To counter this, the location of drug-related deaths and demographic information has been collated and these data will help determine the epidemiology of drug and alcohol use, and help explain the drug trade locally, and internationally[4].

Methamphetamine accounts for nearly 70% of all addictions in Thailand[5]. The increase in methamphetamine addiction represents a dramatic shift as five years ago, 70% of addicts were using opiates[5]. Similar but less dramatic trends, especially among young adults, also are being reported throughout China and Southeast Asian countries[4]. During 2001-2002, over 100 million tablets of methamphetamine were confiscated, along with other drugs, because of the increase efforts of the government. Most of the drugs came from neighboring countries, Burma, Cambodia,

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China, and Laos, primarily produced in the Golden Triangle area. Most clandestine laboratories were located near Thailand's border. Methamphetamine, heroin, and marijuana were the three main kinds of illicit drugs being smuggled from neighboring countries to Thailand. Ecstasy clandestine laboratories were located in Indonesia and the Yunnan Province of the south of China.

Ten of the 37 drug offenders sentenced to death by the Thai courts have been executed. Many were foreign drug traffickers. During the last ten years (April 1992-July 2002), drug trafficker's assets of 2,015.60 million baht have been confiscated. The large assets of Wei Hseuh-Kung's drug networks in Thailand are included in this total[10]. There were 187,479 cases with 199,714 offenders related to methamphetamine seizures in the last year or 81.6% of all drug cases in 2002. Seized drugs were divided as follows:

8,440	kilograms of Methamphetamine tablets (about 93.8 million tablets)
474	kilograms of heroin
1.76	tons of opium
57.59	tons of fresh marijuana
11.30	tons of dried marijuana
1.59	tons of Kratom plants (Mitragyna speciosa)
16.81	kilograms of Ecstasy tablets
8.64	kilograms of cocaine
357	kilograms of volatile substances

(Volatile substances were enforced by the laws. Toluene, which is mixed in thinner, lacquer and glue preparation, is the most common volatile substance. The other volatile substances were acetone, methanol, and isopropanol)

Methamphetamine increased from 82.5 million tablets in 2000 to 93.8 million tablets in 2001. Heroin production in Southeast Asia has drawn many foreign drug traffickers to Thailand for distribution out of the country, to international markets[5]. The epidemiology was studied in these cases, included sex, age, education, occupations, scene, causes, and manners of death. These evidences were brought and considered to execute of drug offenders, drug trafficker, and drug net-workers by the government officials.

Material and Method

Medical investigations to establish causes of death included conduct of autopsy, other forms of pathological evaluation, macroscopic, microscopic, histological, chemical pathology, and laboratory testing. In addition, history of event, crime scene investigation, and evidence from police and relatives were considered in the death investigation.

The decedents resulted from unnatural death in Chiang Mai and other provinces in the northern part of Thailand. One thousand one hundred decedents who had died between 2002 and 2003 were included in this study. There were about 76,353 decedents from the 12,101,196 people in northern part of Thailand[12]. One hundred and fifty three decedents were selected randomly at the Forensic Department, Faculty of Medicine, Chiang Mai University, Thailand 2002-2003. These cases included in the present study, were unnatural deaths from homicide, accident or suicide and there was no medical treatment before death and no significant decomposition.

In the cases that underwent toxicological investigation, causes of death by macroscopic pathologies were undetermined. The specimens were analyzed by immunological test, HPLC, GC HS.

Heart blood (50 ml), femoral blood (1-2 ml), and urine (200 ml) were collected for toxicology and were analyzed immediately. The volume of collected specimens may be less than normal in some cases, however, they was always enough for the analysis. Initial tests included a broad spectrum immunoassay test (Sure Step™ Applied Biotech Inc) for amphetamines, barbiturates, benzodiazepines, benzoylegonine, cocaine, methamphetamine, methadone and morphine. Positive results obtained with these tests were confirmed by Gas Chromatography-Headspace chromatography (GC-HS) or High Performance Liquid Chromatography (HPLC). GC-HS model was Hewlett Packard (HP6890 Series) and Headspace (HP7694 Injection Technique) with capillary column contained Inowax Polyethylene Glycol 19091 N-213 USA length 30 meters, diameter 320 micro-meter, film thickness 0.50 micrometer Flame Ionization Detector (FID). GC-HS was used to identify the volatile substances and alcohol. HPLC or the REMEDi TM HS and Limit Check are trademarks of Bio-Rad laboratories, Inc. and were designed to quantify morphine, methamphetamine, amphetamine, and metabolites in urine. REMEDi HS Drug Profiling System, 110/220 V. includes on site software installation and computer hard drive/RAM upgrade. Drug identification is performed by a multi-wave length UV detector, and data is processed by a sophisticated computer based algorithm. As each drug enters the detector from the last cartridge, a UV scan from 193 nm to 305 nm is collected. Sample spectra are then automatically compared with library of known spectra stored in memory. Sample analysis and drug identification is

completed in approximately 15 minutes. A random urine is collected and be stored at 2-8°C for 3 days. For longer storage, samples should be frozen at -20°C, and warmed to room temperature and mixed well for 30 seconds prior to use[8].

Cut-off values were established for both the initial and confirmation assays. If their values were or above the cut-off values, they were considered positive[8,9]. Results are expressed by range mean ± standard deviation and percentage value. The performance data were shown in the Tables.

Results

One hundred and fifty three decedents resulting from unnatural deaths were studied. The cases had a mean age of 34 years old and range of 10 to 79 years with the most common being 21-25 years (18.6%) (Table1). The 10 years old decedent case was a traffic accident and drugs were not found. Causes of death are described in Table 2.

The details of Amphetamine / Methamphetamine (YaBa)

Methamphetamine was detected in the bodies of thirteen decedents (11 males and 2 females). The most common findings included the age range, 21-30 years (35.4%), primary education stage (69.2%), and laborers (77%) mostly construction laborers. Gunshot injury (69.2%) and homicide (77.0%) were the most common cause of death. The drugs of dependence, including methamphetamine, were presented in these cases. Benzodiazepine was the most common drug (30.7%). Urine methamphetamine ranged from 591-61,147 ng/ml (Table 4). This only demonstrates methamphetamine usage, and not intoxication. All decedents with gunshot injuries were homicides. The revolvers used were mostly (89%) 38 inch or 9 mm caliber bullets. They were the preferred tool used by murderers. More than two gunshot wounds were usually found, commonly in the head and chest, where instant death was more likely.

Discussion

Chiang Mai is the largest and best-known city in northern Thailand. Therefore, it has similar problems, especially drug abuses, to those in other

Table 1. The age range in the 153 deceased cases

Age range (years)	(%)
10-20	9.4
21-25	18.6
26-30	16.8
31-35	15.3
36-40	8.4
41-45	7.6
46-50	9.8
51-55	7.8
56-79	6.3

Table 2. Causes and manner of death in the 153 cases

Causes of death (%)		Manner of death (%)	
Traffic injury	32.6	Accident	39.6
Gunshot injury	26.4	Homicide	28.5
Stab wound / asphyxia / poisoning	41.0	Suicide/unknown	31.9

Table 3. Details of abused drugs in the 153 cases

Incidence of drugs			
Type	%	Type	%
Methamphetamine	8.5	Benzodiazepines*	11.8
MDMA	0.7	Alcohol	53.6
Marijuana	0.7	Toluene	2
Heroin / morphine / cocaine	0	Non-abuse drug	22.7

* Diazepam is the most common kind of Benzodiazepines

Table 4. Details of the 13 cases with evidence of methamphetamine use (YaBa)

Corpse	Sex	Age	Education	Ocupation	Status	Place of death	COD	MOD	MA (ng/ml)	Associate drugs
1	F	35	P	L	Si	Ne	GS	Ho	1,642	BZD
2	F	48	P	L	C	I	GS	Ho	591	BZD
3	M	20	P	L	Si	Ne	GS	Ho	3,829	-
4	M	18	Hi	L	Si	I	H	Su	5,499	Toluene
5	M	34	B	T	C	I	H	Ho	4,626	BZD
6	M	25	N	L	C	Ne	GS	Ho	23,916	-
7	M	54	P	T	C	Ne	GS	Ho	413	MPD
8	M	46	P	L	C	Ne	GS	Ho	5,392	-
9	M	22	P	L	C	I	E	A	11,997	-
10	M	30	P	L	C	Ne	GS	Ho	61,147	-
11	M	56	P	L	C	Ne	GS	Ho	1,537	-
12	M	23	Hi	S	Si	Ne	Po	A	9,372	-
13	M	25	P	L	Si	I	GS	Ho	5,320	-
Average		33							10,406	

F = female, M = male, P = primary, Hi = high school, B = bachelor, N = no education, L= laborer, trading, S = student, Si = single, C = couple, Ne = neighborhood, I = in town, COD = cause of death, Po = poison, GS = gunshot, H = hanging, E= electrocution, MOD = manner of death, Ho = homicide, Su = suicide, A = accident, BZD = benzodiazepine, MPD = meperidine, Ma = methamphetamine

cities around the world such as New York, Tokyo, and Hong Kong etc. Consequences of the abuses of methamphetamine, heroin addiction, alcoholic consumption, sedation, hypnosis, and toluene intoxication are among the most common problems. In the past 10 to 20 years, heroin was the most common and preferred drug used on the street. However, nowadays, methamphetamine or amphetamine derivatives have become the most common drugs because they are readily available and cheap. The consumers are a very big group, comprising mostly of adolescents, students, and laborers. Almost all drug addicts are young adults and adolescents of low education and low income. They have a very close relationship with homicide because of lost income or money and benefits. Government policy was launched vigorously to combat this problem. About 2,500 people said to be connected to suppliers were killed by policemen during capture. This event seemed to calm down the street drug trade for a period. However, it is possible that methamphetamine or other amphetamine derivatives such as MDMA and MDA will come back on the market soon and create further serious problems.

There were three cases with benzodiazepines, and one each of toluene and meperidine in 13 deceased persons.

Benzodiazepines are often preferred by young adults or adolescents in Thailand and Asian countries[10]. They are believed to act similarly to barbiturates, Seconal ,on a neighboring part of the GABA receptor. Benzodiazepines may be used to decrease stimulatory effects of amphetamine, methamphetamine, MDMA, and MDA. Methamphetamine is the most common illicit drug produced by clandestine laboratories in the United States at this time. Methamphetamine continues to be a leading drug of abuses in many parts of the world, such as the United States, Japan, the Netherlands and Thailand. Both their cost and prolonged duration of effects contribute to the increased popularity[11]. Methamphetamine is the most common use in Thailand. Moreover, its cost is about 2-3 US$ which is very cheap and lower than heroin. However, detected benzodiazepines may have been the prescribed drug in some cases, but the cases were believed to be abuse[12].

The study of National Institute of Drug Abuses (NIDA) in 2003 found that 9% of young adults had used methamphetamine within the past year and methamphetamine abuse has been reported in many rural areas of the countries[10]. This is similar to what is found in Thailand. In 1997, the toxicology section of the American Academy of Forensic Sciences reported the incidence of drugs of abuse in urine specimens in 578 cases of alleged sexual assault in USA. They found the 7% incidence of amphetamine abuse[12].

The major drugs of abuse in Great Britain

include amphetamine, benzodiazepines, cannabis, cocaine, methadone, and opiates. However, they include methamphetamine, benzodiazepines, and opiates in Thailand. There were a few cases that died from methamphetamine or amphetamine overdose.

This information has helped us to understand the black marketing strategies behind amphetamine, methamphetamine or YaBa (crazy drug in the Thai language) trading in towns and their neighboring districts. The YaBa trafficking routes are from Burma (Yawn City) through Chiang Rai, Tak, Chiang Mai, other northern parts of Thailand and Bangkok to the USA and Europe. All data will be used for planning to eradicate these drugs from Thailand in line with government strategies.

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อุบัติการณ์การตรวจพบสารเสพติดให้โทษในศพที่เสียชีวิตโดยผิดธรรมชาติในภาคเหนือของประเทศไทย

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อุบัติการณ์การตรวจพบสารเสพติดในศพที่เสียชีวิตโดยผิดธรรมชาติ เช่น อุบัติเหตุจราจร ถูกยิงตาย ฆ่าตัวตาย โดยทำการศึกษาในศพจำนวน 153 ศพ ที่มีอายุตั้งแต่ 10-76 ปี อายุเฉลี่ย 34 ปี เป็นเพศชายร้อยละ 92 อาชีพกรรมกรร้อยละ 76.9 ค้าขายร้อยละ 15.4 และนักเรียนร้อยละ 7.7 สาเหตุการตายเกิดจากบาดเจ็บจากการจราจรร้อยละ 33 ถูกยิงตายร้อยละ 26 และสาเหตุอื่น ๆ อีกร้อยละ 41 ได้แก่ ถูกแทงตาย หรือเสียชีวิตจากสารพิษ การขาดอากาศหายใจ เป็นต้น สำหรับพฤติกรรมการตายเกิดจากอุบัติเหตุร้อยละ 40 ถูกฆาตกรรมร้อยละ 28 และฆ่าตัวตายรวมถึงการตายที่ไม่สามารถระบุพฤติกรรมได้ร้อยละ 32 ผลการศึกษาพบสารเสพติดให้โทษกลุ่มเมทแอมเฟตามีนร้อยละ 8.5 ช่วงอายุของผู้ที่เสพพบมากที่สุดคือ อายุ 21-30 ปี (ร้อยละ 35.4) เป็นเพศชายร้อยละ 85 การศึกษาพบระดับประถมศึกษาเป็นส่วนใหญ่ร้อยละ 69.2 พบผู้ที่เสียชีวิตจากการถูกยิงตายมากที่สุดร้อยละ 69.2 จากการแขวนคอร้อยละ 15.4 ไฟฟ้าดูดร้อยละ 7.7 และได้รับสารพิษร้อยละ 7.7 ผู้เสียชีวิตโดยผิดธรรมชาติที่ตรวจพบสารเมทแอมเฟตามีนในปัสสาวะมีปริมาณตั้งแต่ 591-61,147 นาโนกรัมต่อมิลลิลิตร แต่ไม่ได้เป็นสาเหตุการเสียชีวิต นอกจากนี้ยังตรวจพบ ยากล่อมประสาทกลุ่มเบนโซไดอะซีปีน 3 ศพ ยาเมเพอริดีน 1 ศพ พบแอลกอฮอล์ร้อยละ 53.6 ซึ่งส่วนใหญ่เป็นศพที่เสียชีวิตจากอุบัติเหตุจราจร และพบกัญชาร้อยละ 0.7 แต่ตรวจไม่พบสารเสพติดประเภทเฮโรอีน มอร์ฟีน โคเคน ในศพที่เสียชีวิตโดยผิดธรรมชาติทั้งหมดที่ทำการศึกษา