

# Epidemiological Assessment of Acute Poisoning Death–One Year Survey

Khodabandeh F<sup>1\*</sup>, Emamhadi MA<sup>1</sup>, Mostafazadeh B<sup>1</sup>

<sup>1</sup> Department of Forensic Medicine and Toxicology, Shahid Beheshti University of Medical Sciences, Tehran, Iran

---

## ARTICLE INFO

---

*Article Type:*  
Original Article

---

*Article History:*  
Received: 1 May 2012  
Revised: 23 May 2012  
Accepted: 1 July 2012

---

*Keywords:*  
Fatal Poisoning  
Acute Poisoning  
Drug/Chemical Poisoning  
Overdose  
Epidemiology

---

---

## ABSTRACT

---

**Background:** Acute poisoning by drugs and chemical agents is a medical emergency and carries a high morbidity and mortality rate. The epidemiology of acute poisoning varies between countries and different regions.

**Method:** In this one year retrospective study, we reviewed the epidemiology of patients with acute poisoning (intentionally or unintentionally) who died during hospitalization at Loghman Hakim hospital, Tehran, Iran.

**Results:** Of the 280 cases of completed suicide by self-poisoning 69 (24.6%) cases were female and 211(75.4%) cases were male, between 15-78 years old with mean±SD of 39±17.5. Most of them were conscious (69.6%) on admission to Emergency Department (ED). Past history of any self-harm were positive in 82 (29.3) cases of subjects. Multiple drug toxicity and opioid poisoning were the most common causes of acute poisoning death in 27.5% and 27.1% respectively.

**Conclusion:** Differences based on age category, sex, the types of toxic agents involved and the outcomes of the poisoning death incidents were noted. Future interventions should take these differences into account.

Copyright©2012 Forensic Medicine and Toxicology Department. All rights reserved

---

► *Implication for health policy/practice/research/medical education:* Skill training, problem solving, knowledge and attitude change are important defense tools against drug/chemical poisoning by any intent.

---

► *Please cite this paper as:* Khodabandeh F, Emamhadi MA, Mostafazadeh B. *Epidemiological Assessment of Acute Poisoning Death–One Year Survey. International Journal of Medical Toxicology and Forensic Medicine.* 2012; 2(3):103-109.

---

## 1. Introduction:

Throughout the world, poisoning by drug or chemical, is an important medical emergency and carries a high morbidity and mortality rate (1).

Although acute poisoning can be either

intentional or accidental, most of acute poisonings refers to our hospital are due to intentional act which may be Potentially life-threatening and sometimes fatal, irrespective of intent (2- 4).

Despite the popularity of drug-related poisoning as a method of suicide, the severity and extent of this action varies from country to country and region to region (5- 8). Although socio-economic, cultural and religious context, influence the decision to attempt suicide,

---

*Corresponding author:* Khodabandeh F, MD, MPH.  
Assistant Professor, Department of Forensic Medicine and Toxicology, Shahid Beheshti University of Medical Sciences, Tehran, Iran.  
E-mail: Tennessee\_kh@yahoo.com

psychological background can affect how someone copes with stressors that may lead to commit suicide (9-12).

In developing countries, where there is insufficient drug and chemical regulation, lack of surveillance systems, less enforcement, easy access to many different kinds of drugs or chemical, have been blamed for the higher poisoning rate and possible mortality (13, 14).

## 2. Materials and Methods:

This retrospective cross-sectional descriptive study was conducted to elucidate an epidemiology survey of acute poisoned deceased. The study sample comprised all episodes of acute-poisoning that had resulted in death after admission in a tertiary teaching hospital in Tehran, during one year November 2010-December 2011. The main sources of data were the patients medical records (hospitalization records) available in hospital archive.

The only exclusions were patients under 15 years old, episodes where the poisoning were deemed chronic or on the entrance to ED were dead or just CPR was done for them. We considered two groups of variables or factors influence acute poisoning.

### Host characteristics

We recorded some characteristics of the deceased with history of acute poisoning (definite, possible or suspicious) after admission to hospital. Age, sex, marital status, occupation, past history of self-harm, referral place, duration of hospitalization, were the main variables collected for this purpose.

### Characteristics of agents: information about the agent, the doses, duration and routes of exposure.

Data were entered into SPSS version 17 software and statistical analyses were performed on them. Chi-square analyses were conducted to examine differences in categorical variables.

## 3. Results:

During a one-year study, 280 adult acute poison related deaths, intentional or unintentional were reviewed.

Of all cases analyzed, 24.6% were female (n=69), and 75.4% male (n=211), with age range of 15-78 years and Mean±SD 39±17.5. Age group of 25-40 years with 36.4 % (n=102) were dominant.

Patients were referred to our hospital from other clinical center in 25.4% (n=71), their own residence in 57.5% (n=161) and public places in 17.1% (n=48). Most of the patients (53.6%) were transferred by city ambulatory service (Tehran Emergency service) to ED. History of definite poisoning in 107 cases (38.2%), possible poisoning in 82 cases (29.3%) and suspicious poisoning in 91 cases (32.5%) were recorded. History of previous suicidal attempt were positive in 82 (29.3%) of cases with more than two times in 12.1% (34) of them. There was lack of documentation about history of previous suicide for 152 (59%) cases (Table 1).

The elapsed time between acute poisoning and ED arrival with Mean and standard deviation of 5.6±1.2 was between less than 6 hours and more than 12 hours (0.5-24 hours). Drug consumption <6 hours in 27.1% (n=76), between 6-12 hours in 35.4% (n=99) and > 12 hours in 17.5 % (n=49). No clear post ingestion time for 56 (20%) of cases were detected (Table 1).

On arrival to ED, the level of consciousness in 69.6% (n=195) were >8 and in 30.4% (n=85) were <8 according to Glasgow coma scale with Mean±SD 10±2.9. Length of hospitalization (in hour) till death with Mean±SD 8.3±0.7 were less than one hour in 15.4% (n=43), between 1-6 hours in 17.5% (n=49), 6-24 hours in 30.4% (n=85), more than 72 hours in 17.1% (n=48) and more than a week in 19.6% (n=55) (Table 1).

Multiple drug poisoning, Opioid overdose, aluminum phosphide toxicity were the most common causes of acute intoxication with 27.5% (n=77), 27.1% (n=76) and 18.2% (n=51) respectively, according to

**Table 1:** Characteristics of Autopsy Cases according to Sex, Age, Referral place and Cause, Level of consciousness and Length of hospitalization

Data	Frequency	Percent	Mean±SD
<b>sex</b>			
<b>female</b>	69	24.6	
<b>male</b>	211	75.4	
<b>Age group</b>			
15-24	49	17.5	
25-40	102	36.4	39.0±17.5
40-60	85	30.6	
>60	44	15.7	
<b>Past History of suicide</b>			
Yes	82	29.3	
No	33	11.7	
Unknown	165	59	
<b>Referral place</b>			
health center	71	25.4	
home	161	57.5	
Public place	48	17.1	
<b>Referral cause</b>			
Poisoning—definite	107	38.2	
Poisoning—possible	82	29.3	
Suspicious	91	32.5	
<b>GCS</b>			
>8	195	69.6	10±2.9
<8	85	30.4	
<b>Time elapsed since toxic substance use</b>			
<6	76	27.1	5.6±1.2
6-12 hours	99	35.4	(0.5-24 hours)
>12 hours	49	17.5	
Unknown	56	20.0	
<b>Length of hospitalization</b>			
< 1 h	43	15.4	5±6.5
1-6 h	49	17.5	(1h-30days)
6-24h	85	30.4	
>72 h	48	17.1	
>1week	55	19.6	

**Table 2:** Substances contributing to death.

prim_diag	Diagnosis		Total
	Number	%	
			<b>280</b>
MDT	77	27.5	
ALP	51	18.2	
Opioids & other illegal drugs	76	27.1	
Toxic alcohol	3	1.1	
Anticonvulsants	4	1.4	
Cardiovascular	4	1.4	
Insecticides & Other chemicals	9	3.3	
Unknown	56	20.0	

physician history made either by poisoned patient himself, family/nearby relatives or ambulatory staff. Unknown drug were reported by 56 (20.0%) of cases (Table 2). In analysis, a significant correlation between acute poisoning death and sex ( $P=.000$ ), age group ( $P=.004$ ), referral place ( $P=.02$ ), type of poisonous substance ( $P=.000$ ), post ingestion interval ( $P=.001$ ) were seen.

#### 4. Discussion:

Acute poisoning are an important cause of premature death which may occur under a range of different epidemiological, social, cultural and religious implications.

The substance involved may be one of controlled substances, prescription medicines, over-the-counter (OTC) medicines, or even complex mixtures such as traditional remedies. Since acute poisoning is mostly as a result of attempted suicide, in order to understand epidemiological characteristics on acute poisoning mortality, some knowledge of how such deaths are investigated, certified, registered, and coded is needed (15-17).

Poisoning is a multifaceted problem when medical services data are used in a study, only those cases that were diagnosed are used. Some underestimation of the

frequency of cases may be due to missed diagnosis (18).

This paper explores some of these characteristics of those victims of acute poisoning. Due to improper regulations of controlling drugs and chemicals and lack of awareness of the local population about toxics, makes developing countries at higher risk for poisoning but data for most developing countries are still lacking. A thorough description of the characteristics of the patients, the agent and the circumstances of poisoning is given in this study for some understanding of the epidemiological characteristic self-poisoned mortality (19, 20).

66% of these deaths were due to intentional poisoning, 34% unintentional and in 10% the intent was undetermined. In this study acute poisoning death were mainly as a result of deliberate self-poisoning (66%) which was the same as other studies (21).

Most poisoning deaths were among 15-40 years old males and involved legal or illegal drugs, similar to other studies (22-25).

The distribution of drugs causing fatal poisonings varies depending on the region. In our study, drug related deaths were

**Table 3:** Correlation between demographic characteristics, physical findings and Length of hospitalization with fatal poisoning.

Data	Descents		P-Value
	Female No (%)	Male No (%)	
<b>Age Group</b>			.004
15-24	18 (36.8%)	31 (63.2%)	
25-40	20 (19.6%)	82 (80.4%)	
40-60	19 (22.4%)	66 (77.6%)	
>60	8 (18.2%)	36 (81.8%)	
<b>Time since ingestion</b>			.001
<6 hour	22 (29.0%)	54 (71.0%)	
6-12 hours	24 (24.2%)	75 (75.8%)	
>12 hours	19 (38.8%)	30 (61.2%)	
Unknown	4 (7.0%)	52 (93.0%)	
<b>Referral Place</b>			.02
Health center	21 (29.5%)	50 (70.5%)	
Home	43 (26.7%)	118 (73.3%)	
Open place	5 (10.4%)	43 (89.6%)	
<b>Poisonous substance</b>			.000
MDT	30 (39.0%)	47 (61.0%)	
ALP	20 (39.3%)	31 (60.7%)	
Opioids & other illegal	11 (14.4%)	65 (85.6%)	
drugs	0 (.0%)	3 (100.0%)	
Toxic alcohol	1 (25.0%)	3 (75.0%)	
Anticonvulsants	2 (50.0%)	2 (50.0%)	
b-blockers	2 (22.3%)	7 (77.7%)	
insecticides	3 (5.4%)	53 (94.6%)	
Unknown			

likely due to ingest of opium unintentionally and aluminum phosphide tablet and multiple drugs intentionally than one specified drug. About half of them had

primary contact with other care services. Most subjects were transported to hospital city ambulance (Tehran Emergency Service 115) and from their own residence.

Majority of patients died within the 6-12 hours of admission which mainly reflects to potential of toxic substance which is used.

### 5. Conclusion:

Profile of fatal poisoning in this study is similar to most of other studies. Reducing poisoning death require government policy to restricts toxic substance availability and health care services to plan prevention strategies. Skill training, problem solving, knowledge and attitude change are important defense tools against drug/chemical poisoning by any intent. More research is needed to survey different epidemiology aspects of fatal poisoning.

### References

1. Manini AF, Nelson LS, Olsen D, Vlahov D, Hoffman RS. Medical examiner and medical toxicologist agreement on cause of death. *Forensic Science International*. 2011; Volume: 206.
2. Fathelrahman AI, Rahman AFA, Zain ZM. Self-poisoning by drugs and chemicals: variations in demographics, associated factors and final outcomes. *Gen Hosp Psychiatry*. 2008;30:467-70.
3. Schwake L, Wollenschlager I, Stremmel W, Encke J. Adverse drug reactions and deliberate self-poisoning as cause of admission to the intensive care unit: a 1-year prospective observational cohort study. *Intensive Care Med*. 2009;35:266-74.
4. Lalith S, Shaluka F, Patrick J, Nick A, Michael J, Andrew H Dawson. Changing epidemiologic patterns of deliberate self-poisoning in a rural district of Sri Lanka. *BMC Public Health*. 2012;12:593-98.
5. Clark D, Murray DB, Ray D. Epidemiology and outcomes of patients admitted to critical care after self-poisoning. *The Intensive Care Society*; 2011.
6. Camidge DR, Wood RJ, Bateman DN. The epidemiology of self-poisoning in the UK. *Br J Clin Pharmacol*. 2003;56(6):613–619.
7. Bertolote JM. Deaths from pesticide poisoning: a global response. *British Journal of Psychiatry*. 2006;189:201–203.
8. Hendin H, Ret M. Suicide and Suicide Prevention in Asia, World Health Organization. 2008.
9. Lakshmi V, Pirkis J, Thanh T, Yip P, Rohini D. Socio-economic, Cultural and Religious Factors Affecting Suicide Prevention in Asia.
10. David B. Goldston, Sh, Molock L, Whitbeck L. Cultural Considerations in Adolescent Suicide Prevention and Psychosocial Treatment. *Am Psychol*. 2008;63(1):14–31.
11. Ying-Yeh Ch, Kevin Ch, SamanY, Paul SF. Suicide in Asia: Opportunities and Challenges. *Epidemiol Rev*. 2011:
12. Sanjeev Kumar, AkhileshPathak, H. M. Mangal, Trends of Fatal Poisoning In Saurashtra Region of Gujarat, *J Indian Acad Forensic Med*. July-September 2011, Vol. 33, No. 3 ISSN 0971-0973
13. Josef G, Stober J, Pronczuk J. Acute pesticide poisoning: a proposed classification tool *Bulletin of the World Health Organization*. 2008;86(3):161-240
14. Owens D, Wood ch, Hughes T, Dennis M. Mortality and suicide after non-fatal self-poisoning:16-year outcome study; *British J Psychiatry*. 2005.
15. Sut N, Memis D. Intensive care costs of acute poisoning cases. *ClinToxicol* 2008;46:457-60.
16. Kristinsson J, Palsson R, Gudjonsdottir GA. Acute poisonings in Iceland: a prospective nationwide study. *ClinToxicol*. 2008;46:126-32.
17. Lam S, Lau AC, Yau WW. Over 8 years' experience on severe acute poisoning requiring intensive care in Hong Kong, China. *Hum ExpToxicol*. 2010;29:757-65.
18. Cook R, Allcock R, Johnston M. Self-poisoning: current trends and practice in a UK teaching hospital. *Clin Med*. 2008;8:37-40.
19. Henderson A, Wright M, Pond SM. Experience with 732 acute overdose patients admitted to an intensive care unit over six years. *Med J Aust*. 1993;158:28-30.
20. Gunnell D, Ho D, Murray V. Medical management of deliberate drug overdose: A neglected area for suicide prevention? *Emerg Med J*. 2004;21:35–8.

21. Gupta BD, Vaghela PC. Profile of fatal poisoning in & around Jamnagar, JIAFM. 2005;27(3):145-48.
22. Das RK: Epidemiology of insecticide poisoning at AIIMS emergency services and role of its Detection by Gas liquid chromatography in diagnosis. 2007;7(2):7-12.
23. Shingh VP, Sharma BR, Dasari H, Krishan V. A ten year study of poisoning cases in a tertiary care hospital, Ind Internet J of For Med & Toxicolo, 2004;1(2).
24. Julien H. Undetermined Manner Drug Poisoning Deaths, Oklahoma, Injury update, A report from Oklahoma Injury Surveillance Participants, February 6. 2009.