

## Prevalence of Acute Drug Poisoning at the Emergency Department of the National University Hospital Centre of Benin (CNHU-HKM): A Preliminary Study

Razack Osseni<sup>1\*</sup>, Zahria Adou<sup>1</sup>, Pamphile Assouto<sup>2</sup>, Cédric Bigot<sup>3</sup>, Abdoulatif Diallo<sup>4</sup>, Dine K Baba<sup>5</sup>, Rosemonde Mouzouvi<sup>6</sup>, Béatrice Sangare<sup>7</sup>, Grégoire Gansou<sup>8</sup>, André Bigot<sup>9</sup> and Anatole Laleye<sup>10</sup>

<sup>1</sup>Laboratoire de Toxicologie, Faculté des Sciences de la Santé, Université d'Abomey, Calavi, Benin

<sup>2</sup>Unité des Urgences, Centre National Hospitalier Universitaire Hubert K. MAGA, FSS/UAC, Cotonou, Benin

<sup>3</sup>Service de Médecine Interne, Centre National Hospitalier Universitaire Hubert K. MAGA, Cotonou, Benin

<sup>4</sup>Département de toxicologie, Faculté des Sciences de la Santé, Université de Lomé, Togo

<sup>5</sup>Service de Médecine de Travail, Clinique Centrale de Calavi, Abomey, Calavi, Bénin

<sup>6</sup>Pharmacie Fleuve de Vie, Abomey, Calavi, Bénin

<sup>7</sup>Unité de Toxicologie, Université Félix Houphouët-Boigny UFR des Sciences Médicales, Côte d'Ivoire

<sup>8</sup>Centre National Hospitalier Universitaire Psychiatrique Jacquot, Cotonou, Benin

<sup>9</sup>Unité d'Enseignement et de Recherche en Immunologie, Faculté de Sciences de la Santé, UAC, Bénin

<sup>10</sup>Unité d'Enseignement en Biologie Humaine, Faculté de Sciences de la Santé, UAC, Bénin

\***Corresponding Author:** Razack Osseni, Laboratoire de Toxicologie, Faculté des Sciences de la Santé, Université d'Abomey, Calavi, Benin.

**Received:** September 02, 2021; **Published:** November 30, 2021

### Abstract

**Introduction and Aim:** Severe acute drug poisoning is a common cause of admission to the emergency department in many countries worldwide. This study aimed to investigate epidemiological and descriptive characteristics of acute drug poisonings at the emergency department of the national university hospital centre of Benin (West Africa).

**Methodology:** This retrospective study was carried out for the period between 2012 - 2016. Analyses were focused on socio-demographical (age, sex, marital situation, place of residence, ethnic group, profession), etiological (causes, history of disease, type of drug, route of poisoning) and clinical characteristics (diagnosis, outcome, prognosis).

**Results:** At all, 150 cases of acute drug poisonings were recorded, representing for 48.43% from the total number of poisonings. The majority of these poisoning victims were young (between 21 - 30 years) (40.7%) female (64.7%) students (36%). Most of them were suicide attempts (93.33%) characterized by emotional conflict. Benzodiazepines were mostly involved (38.7%) represented by diazepam (23.3%). The most frequent signs were tachycardia (74%) and blood ions were mostly prescribed as paraclinical exams. In the major of cases, information about home detoxication measure was not inquired; however red oil and milk were practiced by almost to 15% of patients. Few toxicological exams (15%) were prescribed. In general, patients' outcome were mostly favorable through medical care. Mortality was in 0.3% of the total registered number of acute drug poisonings.

**Conclusion:** This study relates information about acute drug poisoning in Benin as well as the great lack of toxicology management in the country.

**Keywords:** Acute Poisoning; Toxicity; Emergency Department; Drug; Benin

## **Introduction**

Severe acute drug poisoning is a common cause of admission to emergency department [1] in both developed and developing countries as reported by many authors in many countries worldwide. Poisoning results after exposure to a toxic product by ingestion, inhalation, dermal exposure, rectal or intravenous administration. According to world health organization, poisoning is a part of the overall context of accidental and/or voluntary diseases [2]. In 2008, acute drug poisonings were found to be the first cause of acute poisoning in USA. In top 25 substance categories associated with the largest number of fatalities, the first five positions were occupied by drugs poisonings and in the state of Utah, there was a 5-fold increase in the number of toxic deaths from 79 in 1991 to 391 in 2003 [3,4].

Unlike many countries such as the United States and the United Kingdom, there is no national register of voluntary poisoning in France [5]. Easy access to toxic products plays a major role in the prevalence of both suicidal and accidental poisoning [6]. Poisoning is considered as severe when patient needs closed monitoring or severity of the symptoms (coma, convulsion, respiratory distress, alveolar hypoventilation, or conduction disorder among other variables considered.) or for patient with underlying context (comorbidity, elder people or infant) [7]. The concerned population varies from child to the old man, it may be accidental or suicidal; however, young people are the most concerned, making it a real public health problem [2]. Many drugs are responsible but those which act on the central nervous system (sedatives, hypnotics, anticonvulsants, antidepressants, morphine among other variables considered.) are the one which produce severe poisoning [8]. Mortality also remains important, even incomprehensible for some toxic, despite symptomatic management that seems optimal [9]. In Africa and particularly in Benin, the prevalence of acute drug poisoning is still poorly known because few studies concerning acute poisoning are available. Indeed the most recent study on acute drug poisoning in Benin dates from 1987 and has not been published [10]. Moreover, until nowadays, there is neither a poisoning treatment centre nor a toxicological unit in the biggest medical reference centre (hospital) of Benin. This study aimed to investigate epidemiological and descriptive characteristics of acute drug poisonings at the emergency department of the national university hospital centre of Benin (West Africa).

## **Materials and Methods of Study**

### **Nature of the study**

This is a retrospective cross-sectional study based on a descriptive purpose. It took place from February to April 2017 and focused on medical charts of all patients received from January 1<sup>st</sup>, 2012 to December 31<sup>st</sup>, 2016.

### **Population of study**

All patients admitted to the emergency department of the national university hospital centre of Benin that presented clinical signs of drug poisoning were included during the studied period. The eligibility criteria included all patients of all ages, both sexes, admitted to the emergency unit for acute drug poisoning, whether self-confirmed or by their family or established on discharge.

### **Sampling**

Medical chart describing admission to the emergency department of all patients for poisoning during the study period were surveyed. A total of 150 cases that met the eligibility criteria were selected.

### **Variables**

- Dependent variable: Type of acute drug poisoning.
- Independent variables: These include socio-demographic characteristics (age, gender, ethnic group, residence, occupation (civil servant, no profession, students, traders among others.), Marital status; drug pharmacological classes, active ingredients; comorbidities; Time between the poisoning and the admission to hospital; Type of clinical signs; previous history of poisoning; Mortality; Type of medical treatment; Unavailable information was classified as unknown.

**Data collection**

We firstly recorded all acute poisonings from the registers at the emergency department during the studied period. Then we selected the medical charts of those concerning acute drug poisoning (N = 150). All these data were collected and analyzed according to the data collection form. Further information was collected in other services according to the clinical management of the patient.

**Data processing and analysis**

The results were recorded in an Epi DATA version 3.1 databases and analyzed in the STATA 11 software. The chi<sup>2</sup> test of Pearson was used to analyze the variables.

**Results**

**Frequency**

During the studied period from January 2012 to December 2016, 309 patients were admitted to the emergency centre of the CNHU-HKM for acute poisoning. Among them 150 were eligible for acute drug poisoning (48.54%).

**Descriptive characteristics**

We observed women predominance with 64.7%, which correspond to a sex ratio (W/M) of 1.80. The mean age of patients was 29 ± 13,94 years varying from 3 and 89 years. Patients aged from 21 to 30 years were the most represented (40,7%) of cases. More than three Forth of patients were under 40 years old (See table 1).

The Fons ethnic group was widely represented among the topics in our series as shown in this chart (61.3%). The other ethnic groups found included Yoruba (11.3%), Mina (7.3%), Adja (5.3%) and others (14.8%).

**Distribution according to profession**

Table 1 shows that high school and college students were mostly involved in drug poisoning with 36% of cases. Approximately, one-third (1/3) were civil servants and 14% were traders.

Age range (years)		Number of Cases	Percentage (%)
Age	≤ 20	42	28,0
	[21 - 30]	61	40,7
	[31 - 40]	23	15,3
	[41 - 50]	6	4,0
	≥ 51	17	11,3
	Not inquired	1	0,7
	Total	150	100

Profession	Student	54	36
	Official	33	22
	Trader	21	14
	Household	20	13,3
	Not inquired	8	5,3
	Artisan	5	3,3
	Without profession	4	2,7
	Artist	2	1,3
	Taxi-driver	3	2
	Total	150	100

**Table 1:** Distribution according to the age and professional activity.

\*Effective [16-20] years = 35 \*Effective ≤ 15 years = 7.

**Distribution according to their marital status**

The most of intoxicated patients were single (63.3%) followed by married couples (31.3%). The remaining medical charts were not filled in.

**Distribution according to the history of diseases**

Most of the patients declared not suffering from specific disease in the past (86.67%). Among those with history diseases, psychiatric disorders were predominant (7.33%).

**Distribution according to the nature of poisoning**

Acute drug poisoning occurred most often in patients voluntarily (93.33%) of cases and almost half (64.48%) of voluntary poisonings were due to affective (emotional) conflicts (Table 2) whereas psychiatric disorders represented 79.06% of the involuntary (accidental) poisonings (Table 2).

Type of poisoning		Number of cases	Percentages
Voluntary Poisoning	Affective conflicts	69	64.48
	Not inquired	19	17.75
	School failure	9	8,4
	Undesired pregnant	9	8,4
	Alcohol withdrawal syndrome	1	0,93
	Total	107	100
Involuntary Poisoning	Psychiatric trouble	34	79.06
	Therapy error	6	13.95
	*VHA	2	4.65
	Inattention	1	2.32

**Table 2:** Distribution according to the type of poisoning.  
\*Victim of Homicide Attempt.

Table 3 shows that suicide attempts remains the most reason leading to poisoning in our study (83.3%). Other reasons such as abortion, crime, stealing were also encountered. Benzodiazepines were predominantly represented pharmacological drug class with 38.7% of cases and in 20% cases with antipyretics/analgesics (Table 4). In the study, we found that the majority of benzodiazepines were represented by diazepam (Table 5). It was represented by 23.3% of medications.

	Cause of poisoning	Number of Cases	Percentage (%)
Reason of Voluntary Poisoning	Suicide	125	83,3
	Non inquired	10	6,7
	Abortion	9	6,0
	Crime	2	1,3
	Stealing	2	1,3
	medication	2	1,3
	Total	150	100

**Table 3:** Distribution according to main cause of poisoning.  
Suicide is the most reason leading to poisoning in our study (83.3%).

Drug Therapeutic Class	Class	Effective	Percentage (%)
	Benzodiazepine	58	38,7
	Antipyretics+antalgics	30	20,0
	Antimalarials	15	10,0
	Antidepressants	15	10,0
	Multidrugs	14	9,3
	Antihypertensives	11	7,3
	Antibiotics	11	7,3
	Anti inflammatory	10	6,7
	Neuroleptics	7	4,7
	Unknown	5	3,3
	Traditionnal Medications	5	3,3
	Antihistamines	5	3,3
	Antispasmodics	2	1,3
	Oral contraceptive drugs	2	1,3
	Antidiabetics	1	0,7
	Antivitamin k	1	0,7

Active Ingredient	Drug	Effective	Percentage (%)
	Diazepam	35	23,3
	Paracetamol	28	18,7
	Quinin	21	14,0
	Multidrugs	14	9,3
	Amitriptylin	11	7,3
	Bromazepam	7	4,7
	Chloroquin	7	4,7
	Haloperidol	7	4,7
	Chlorazepam	4	2,7
	Acetylsalicylic Acid	4	2,7
	Levomepromazin	3	2,0
	Alprazolam	2	1,3
	Oxazepam	2	1,3
	Chlorpromazin	2	1,3
	Carbamazepin	2	1,3
	Clonazepam	1	0,7
	Prazepam	1	0,7
	Tetrazepam	1	0,7
	Zolpidem	1	0,7
	Ibuprofen	1	0,7
	Metamizol	1	0,7
	Insulin	1	0,7
Gibenclamid	1	0,7	
Clomipramin	1	0,7	
Paroxetin	1	0,7	
enoxaparin	1	0,7	

Table 4: Distribution according to drugs involved and the pharmacological class.

Paraclinical exams	Paraclinical tests	Effective	Percentage (%)
	Blood Ions	143	86,7
	Uremia	125	83,3
	Creatininemia	125	83,3
	Hemogram	110	73,3
	Glycemia	80	53,3
	Transaminases	50	33,3
	ECG	50	33,3
	Pregnancy test	14	9,3
	Obstetrical Echography	24	16
	Hemostasis (PT/APTT)	20	13,3
	Thoracic Radiography	10	6,7
	Thick drop	10	6,7
	HIV	3	2

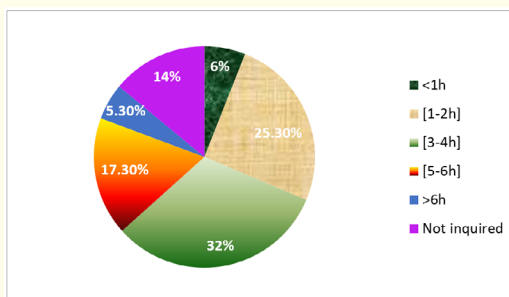
  

Medical Care	Perfusion	136	90,7
	Activated charcoal	45	30,0
	Gastric irrigation	44	29,3
	Bladder catheterization	28	18,7
	Nasogastric catheterization	25	16,7
	Oxygen	14	9,3
	Endotracheal intubation	6	4,0
	Induced vomiting	4	2,7
	Aspiration	4	2,7

**Table 5:** Distribution according to paraclinical exams and medical care.

Tachycardia was the most prominent sign with 74% of cases, followed by abdominal pain with 60% of cases, polypnea with 52%. Blood ions were predominantly prescribed as for paraclinical exams (86.7%) followed by urea/creatinine (83.3%), and hemogram (73.3%).

This table shows the different types of products administered to intoxicated subjects by their close relatives at home. 8.67% of patients received red oil and 6% received milk. Figure 1 relates the mean time patients stay before the first care at the emergency center of Cotonou. It appears that in 32% of cases, patients were managed 3 to 4h after drug ingestion and in 25.3% of cases 1-2h after.



**Figure 1:** Waiting time before care at hospital.

### **Distribution according to toxicological exams**

Toxicological exams were rarely done. Blood was taken in 9,33% of the case, 5,33% in the urine and 1,33% in the gastric liquid. Out of all these toxicological collections, none exam was done.

### **Distribution according to medical care after poisoning**

A symptomatically perfusion treatment was the most action performed (90.7%). Activated charcoal was administered in 30% of cases.

### **Discussion**

This study, however retrospective, described epidemiological, clinical and evolutive characteristics of Acute Drug Poisoning ADP admitted to the emergency department of CNHU-HKM (Benin). In general, few data are available on the frequency of acute drug poisoning in hospitals especially in Benin. In this study, 48.54% of cases represented acute drug poisoning. According to Makita R [10] in 1987 prevalence of acute drug poisonings at the emergency department of the National Hospital of Benin raised up to 62.15%. Many factors may stand for this high level; such as the attempts to suicides, the increase in self-medication, easy and free access to medicines, the proliferation of fake medicines sale, medicines storage at homes and also because the university emergency center of Cotonou is a referral center so the most serious cases were directed there. Many other authors reported similar high rates sustaining that drugs are really leading cause of acute poisoning [11-14]. The acute drug poisoning was found more often in young female (21 to 30 years old) similar to those reported by other authors who reported that 50 - 60% of patients admitted to hospital due to acute drug poisonings were female [15-18]. But these findings differ from those reported in the western part of Iran and India, where the poisonings are more frequent in men, possibly due to drugs addiction or to the religious characteristics in these regions, reasons actually mentioned by the authors [19-21].

In our serial, abortion attempted would certainly be the main reason of the common use of drugs. On the other hand, the psychological structure is much more fragile in female who less tolerate problematic situations than men. One third of our patients were young with a mean age of 29 years old. Many authors reported the same observation among teenagers [22,23]. Indeed, teenagers are considered as the active part of the population which is more sensitive to professional or academic stress or affective disorders. In children, acute drug poisoning is in most cases accidental. In our study, most of the poisoned patients were students (36%); followed by officials (22%) then traders with 11% of cases. However, unemployment might be also a cause of ADP mostly in suicide attempts. Most of the recorded patients (86.67%) declared they had no particular disease history. Among those with a medical history (13.33%), thirty percent (30%) were followed for psychiatric disorders. As related in the literature data, the majority of recorded poisoning cases were voluntary or intentionally (93.33%), generally for suicidal purposes (83.3%) [24-27]. The main circumstances were emotional conflicts (49.3%) and psychiatric disorders (16.4%). According to Mackita R conflicts (20.30%) and love discords (12.29%) were the most causes leading to suicidal attempts [11]. Each suicide attempt would therefore be a complete and unique skein of family history, psychological tendencies and biographical events. This would be a fundamental failure of education, a social effect which would reflect the loneliness and the disintegration of the familial unity.

Many substances could be implicated in acute poisonings in different countries. In this study, benzodiazepines were the most frequent involved drugs (38,7%). This observation is the most reported worldwide. Voluntary poisoning with psychotropic drugs remains the most common etiology in Europe [28,29]. According to Reydel T, *et al.* benzodiazepines were the most frequently ingested drugs (65% of patients) [15]. In contrast, Mackita R [11] in 1987 in Benin found a highest poisoning by amino-4-quinoleines (55.77%). All these poisonings might possibly be in relation to their prescription, their availability, their toxicity, the easy access and of course the aim of poisoning. Diazepam alone represented 23.3% of all the drug recorded. This observation of the predominance of diazepam compared to other drugs might be explain by our context, its easy access, its free sale although not allowed, normally dispensed by prescription in pharmacies, its availability, its lower cost and self-medication. As for traditional medicines, they were responsible for 3.3% of acute drug intoxication in our study. The main clinical symptoms recorded were predominated by tachycardia, stomach aches, polypnea, fever, diarrhea and vomiting. Considering the period between the moment of the arrival at the emergency unit and care, thirty two percent (32%) of patients were

taken care within 3 - 4 hours after admission; followed by twenty five percent (25%) who were under care 1 - 2 hours of drugs. In our context, this delay in medical response of patients might be explained either by the lack of financial support for the treatments or the unavailability of physicians upon the admission of poisoned patients. The nature of the toxic and the codification of the treatment might be important factors in ADP prognoses. The rapid is the medical response (care); the better will be the prognosis of patient ADP. However, even if this period is short, there is a risk of further complication, which requires close monitoring of any patient admitted for ADP [29]. A free interval which corresponds to the diffusion of the toxic is usual necessary after poisoning, followed by a clinical manifestation phase during which the management is often required [30].

In our investigation, few toxicological examinations were requested by physicians (not carried out). About nine percent (9.33%) in the blood, 5.33% in urine and 33% in the gastric liquid requests were formulated. No toxicological examination was carried out as stated commonly by many other authors [31,32]. These results highlighted the difficulties in many countries to carry out toxicological examinations especially in Benin. This could be interpreted by absence of a toxicology laboratory and even less a poison or toxicological information center and service. Indeed, toxicological examinations in laboratory would objectively allow the identification and determination of toxic agents underlying the poisoning. This would therefore facilitate diagnosis, treatment and prognosis as well as prevention of poisoning.

Regarding the management approaches, symptomatic care was mainly employed as stated by many other authors [33-36]. Therefore, almost ninety one (90.7%) percent of our patients systematically had venous access in our records. The most commonly used therapeutic procedures were: gastric lavage in 29.3% of cases, administration of activated charcoal in 30% of cases and use of the specific antidote in 12% of cases. The outcomes recorded after management were favorable in 86% of cases out of whom seventy two percent (72%) of patients were discharged home; the others were referred toward specialized services. However hemodynamic complications were encountered at 1.8% of cases and a mortality of 4.7% was observed. Mackita R reported almost ninety seven percent (97%) favorable outcome with 3.20% mortality [10]. The outcome is usually good and hospital stays are short, even among patients requiring intensive care. In the USA, France and England, mortality is less than 1% [37-39]. The mortality from drug poisoning is related to several factors such as the nature and the dose ingested of the drug, the reason for the intoxication, the health history of the patient, the particular sensitivity of each individual, the association of several toxic and the time taken for management.

## **Conclusion**

Acute drug poisoning remains a public health problem in Benin and its health outcomes are far from negligible. At the end of this retrospective study carried out over the period from January 1, 2012 to December 31, 2016, relating to the prevalence of acute drug poisoning at the emergency unit of the national hospital center (CNHU-HKM) of Cotonou, we believe that significant information were provided. It's clearly appears that drug acute drug poisoning frequency remains high in our country. It especially affected young single women. The majority of poisonings was voluntary and occurred in an emotional conflict context. Diazepam remains the most involved drug. Fortunately, they require relative simple care usually and have good short-term outcome however lethality remains not neglected.

## **Funding Support**

None.

## **Author's Contributors**

Zahria A, Razack O and Pamphile A proposed and realized the study. Cédric B and Dyne B analyzed the results. Abdoulatif D, Rosemonde M, Grégoire G, Anatole L, participated to the design and André B. corrected the manuscript. All the other authors read and approved the manuscript.

## **Bibliography**

1. Megarbane B., *et al.* "Intoxication grave de l'adulte: épidémiologie, définition, critères d'admission en reanimation" 15 (2006): 354-363.
2. Henry J., *et al.* "World Health Organization and International Programme on Chemical Safety". Organisation Mondiale de la Santé (OMS). *Prise en charge des intoxications. Manuel de l'agent de santé* (1998).



3. Bronstein C Alvin *et al.* "Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 26<sup>th</sup> Annual Report". *Clinical Toxicology* 47 (2008): 911-1084.
4. Centers for Disease Control and Prevention (CDC). "Increase in poisoning deaths caused by non-illicit drugs, Utah, 1991-2003". *Morbidity and Mortality Weekly Report* 54.2 (2005): 33-36.
5. Morgan O., *et al.* "Fatal toxicity of antidepressants in England and Wales 1993-2002". *Health Statistics* 23 (2004): 18-24.
6. Charra B., *et al.* "Intoxications aiguës graves chez l'adulte en réanimation médicale". *Annales de Toxicologie analytique* 25.1 (2013): 7-11.
7. Megarbane B., *et al.* "Intoxications graves par médicaments et substances illicites en réanimation". *Réanimation* 15 (2006): 332-342.
8. Chevret L. "Intoxications graves : prise en charge en réanimation pédiatrique". *Archives de Pédiatrie* 11 (2004): 680-682.
9. Cordier L., *et al.* "Les toxiques les plus courants et les plus dangereux". *Urgences* (2009): 12.
10. Mackita R. "Intoxications médicamenteuses aiguës au Centre National Hospitalier Universitaire de Cotonou". Thèse de Médecine. Bénin: Faculté des Sciences et de la Santé de Cotonou, Université d'Abomey-Calavi (1988): 5-60.
11. Baudf J., *et al.* "Evolution de 1997 à 2008 des intoxications admises en réanimation. Données franciliennes (CUBRéa). In: intoxications aiguës Références en réanimation". Collection de la SRLF. Springer, Paris (1997).
12. John Ruedy. "Acute drug poisoning in the adult". *CMA JOURNAL* 109 (1973): 605.
13. Albert M., *et al.* "Emergency department visits for drug poisoning: United States, 2008-2011. NCHS Data Brief, no. 196. Hyattsville, MD: National Center for Health Statistics (2015).
14. Burillo-Putze G., *et al.* "Clinical Toxicology Working Group, Spanish Society of Emergency Medicine (SEMESTOX) National multicentre study of acute intoxication in emergency departments of Spain". *European Journal of Emergency Medicine* 10.2 (2003): 101.
15. Reydel T. "Examens complémentaires non toxicologiques dans les intoxications médicamenteuses: étude prospective". *Réanimation* 22 (2012): S 263- S266.
16. Charra B., *et al.* "Intoxications aiguës graves chez l'adulte". *Annales de Toxicologie Analytique* 25.1 (2013): 7-11.
17. Exiara T., *et al.* "A prospective study of acute poisonings in a sample of Greek patients". *Central European Journal of Public Health* 17.3 (2009): 158-160.
18. Hovda KE., *et al.* "Acute poisonings treated in hospitals in Oslo: a one-year prospective study (I): pattern of poisoning". *Clinical Toxicology: The Official Journal of the American Academy of Clinical Toxicology and European Association of Poisons Centres and Clinical Toxicologists* 46.1 (2008): 35-41.
19. Srivastava A., *et al.* "An epidemiological study of poisoning cases reported to the National Poisons Information Centre, All India Institute of Medical Sciences, New Delhi". *Human and Experimental Toxicology* 24 (2005): 279-285.
20. Ramesha KN., *et al.* "Pattern and outcome of acute poisoning cases in a tertiary care hospital in Karnataka, India". *Indian Journal of Critical Care Medicine* 13 (2009): 152-155.
21. Shadnia, *et al.* "Pattern of acute poisoning in Tehran-Iran in 2003". *Human and Experimental Toxicology* 26 (2007): 753-756.
22. Suokas J., *et al.* "Long-term risk factors for suicide mortality after attempted suicide--findings of a 14-year follow-up study". *Acta Psychiatrica Scandinavica* 104.2 (2001): 117-121.

23. Owens D., *et al.* "Mortality and suicide after non-fatal self-poisoning: 16-year outcome study". *British Journal of Psychiatry* 187 (2005): 470-475.
24. Ahmadi A., *et al.* "Pattern of acute food, drug, and chemical poisoning in Sari City, Northern Iran". *Human and Experimental Toxicology* 29.9 (2010): 731-738.
25. Bavunog̃lu I., *et al.* "Characteristics of acute adult poisoning cases admitted to a university hospital in Istanbul". *Human and Experimental Toxicology* 23.7 (2004): 347-351.
26. Fernando R. "The National Poisons Information Centre in Sri Lanka: the first ten years". *The Journal of Clinical Toxicology* 40 (2002): 551-555.
27. Islambulchilar M., *et al.* "Acute adult poisoning cases admitted to a university hospital in Tabriz, Iran". *Human and Experimental Toxicology* 28.4 (2009): 185-190.
28. Isacsson G., *et al.* "Self-poisonings with antidepressants and other psychotropics in an urban area of Sweden". *Annals of Clinical Psychiatry* 7.3 (1995): 113-118.
29. Villa A., *et al.* "Intoxications aiguës les plus fréquentes". *Encycl Med Chir.* (Elsevier Masson SAS, Paris), Médecine d'urgence (2007): 25.
30. Szymanowicz A and Danel V. "Bio-marqueurs de toxicité dans les principales intoxications graves". *Immuno-Analyse Biologie Spécialisée* 20 (2005): 144-160.
31. Ruedy J. "Acute drug poisoning in the adult". *CMA* 109 (1973): 603-608.
32. Heyerdahl F., *et al.* "Clinical assessment compared to laboratory screening in acutely poisoned patients". *Human and Experimental Toxicology* 27.1 (2008b): 73-79.
33. Armand J. "Antidotes et intoxications aiguës". *Paris* (1971): 35-161.
34. Desplanques L. "Conduite à tenir devant une intoxication aiguë médicamenteuse chez l'enfant". *Développement et santé* 118 (1995): 1-16.
35. Repetto MR. "Epidemiology of poisoning due to pharmaceutical products, Poison Control Centre, Seville, Spain". *European Journal of Epidemiology* 13 (1997): 353-356.
36. Lam SM., *et al.* "Over 8 years experience on severe acute poisoning requiring intensive care in Hong Kong, China". *Human and Experimental Toxicology* 29.9 (2010): 757-765.
37. Satar S and Seydaoglu G. "Analysis of acute adult poisoning in a 6-year period and factors affecting the hospital stay". *Advances in Therapy* 22.2 (2005): 137-147.
38. Bronstein AC., *et al.* "Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 28th Annual Report". *Clinical Toxicology* 49.10 (2011): 910-941.
39. Greene L., *et al.* "Acute poisoning: understanding 90% of cases in a nutshell". *Postgraduate Medical Journal* 81.954 (2005): 204-216.

**Volume 9 Issue 12 December 2021**

**©All rights reserved by Razack Osseni., *et al.***