

THE PROFILE OF ACUTE POISONING AND ENVENOMATIONS IN A TERTIARY HOSPITAL IN SOUTH-SOUTH NIGERIA- A 5 YEAR RETROSPECTIVE STUDYAyinbuomwan A. S.*^{1,2} and Isah A. O.^{1,2}¹Clinical Pharmacology and Therapeutics Unit, Department of Medicine, University of Benin Teaching Hospital, Benin City.²Department of Clinical Pharmacology and Therapeutics, University of Benin, Benin City, Nigeria.

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ABSTRACT

Acute poisoning is a medical emergency. It comprises injuries in which the toxic effects manifest almost immediately. This study profiled the cases of acute poisoning and envenomations presenting to the Adult Medical Emergency in a tertiary hospital in South -South, Nigeria. It is a retrospective, and descriptive study. This study was conducted between January 2013 and December 2017. A total number of 152 patients (acute poisoning 86, envenomations 66) were recorded during this study period. Those with a diagnosis of acute poisoning had more males (59, 68.6%) than females (27, 31.4%), with a male to female ratio of 2.2:1. The mean age (SD, range) age was 37.8 (18.2, 19-96) years. More than half of the cases of acute poisoning in this study were accidental (53, 61.6%). There were 66 cases of envenomations (92.4% snake, 7.6% scorpion); of these 36 (54.5%) were males while 30 (45.5%) were females, with a male to female ratio of 1.2:1. The mean age was 34.7 ± 12.6, with an age range of 18-83 years. Those between age group 18-40 years (young adults) constituted 62.1% of the victims. Pharmaceuticals were the most implicated among the acute poisonings (33, 38.5%), followed by alcohol (20, 23.3%). Pesticides and carbon monoxide poisoning were 13 (15.1%) and 4(4.7%) respectively. In conclusion, the findings in this study suggest a need for a more comprehensive health education and general public awareness on the risks and dangers of poisoning. Profiling of epidemiological data of acute poisoning by developing countries will enhance effective prevention and control of poisoning, thus decreasing morbidity and mortality.

KEYWORDS: Acute poisoning, Envenomations, Nigeria.**INTRODUCTION**

Acute poisoning is a medical emergency. It has increasingly become a significant global public health problem.^[1] Toxicants are a cause of both morbidity and mortality in many parts of the world.^[2] The substances used vary geographically, culturally, and socioeconomically due to their availability and routine use. The pattern of acute poisoning also changes with time and can differ between geographical areas within the same country. It comprises injuries in which the toxic effects manifest almost immediately usually within hours from the time of exposure following a single large dose or series of doses or exposures. Poisons are substances capable of producing damage or dysfunction in the body by its chemical activity. It can enter the body through ingestion, parenteral injection, or inhalational and produce localized or systemic effects. It could be intentional or unintentional. According to the WHO, over 350,000 people died worldwide from unintentional poisoning in 2004 resulting in the loss of over 7.4 million years of healthy life (disability adjusted life years (DALYs)). In 2012, an estimated 193,460 people died worldwide from unintentional poisoning, of these 84%

occurred in low and middle-income countries. Same year, unintentional poisoning caused the loss of over 10.7 million years of healthy life (disability adjusted life years (DALYs)).^[1] In addition, there are approximately 800,000 suicide cases yearly.^[3] More than 25% of the global burden of disease is linked to environmental factors including exposures to and inappropriate use of toxic chemicals. There is an increasing incidence of intentional poisoning in developing countries.^[4] This may be associated with the growth of motorized transport, urbanization, expansion of industrial production, increasing use of generators, and greater availability and access to chemicals, illicit street drugs and pharmaceuticals. It is important to characterize the nature and severity of acute poisoning in order to establish comprehensive preventive measures, as well as stocking essential antidotes. The epidemiology of poisoning in many African counties is not well established.^[2] Available studies in Nigeria are mostly limited to paediatric age groups.^[5,6,7,8] This study therefore profiles the cases of acute poisoning seen at the Adult Medical Emergency in a tertiary hospital in South -South, Nigeria.

METHODOLOGY

This study was carried out in the University of Benin Teaching Hospital (UBTH), in Benin City, Edo state, South- South, Nigeria. It is an 850 bed federal government tertiary hospital, serving as a referral centre for Edo and the adjoining States. This study was conducted between January 2013 and December 2017. It is a retrospective, and descriptive study. Data were extracted from case records and case files on a structured data collection form. Data obtained included demographics, type of toxic agents, route of exposure, length of hospital stay, circumstances of poisoning (i.e accidental, deliberate self-harm, and recreational) and outcome (i.e recovery or death). All patients with a diagnosis of acute poisoning were included in this study. Ethical approval was obtained from the University of Benin Teaching Hospital Ethics and Research Committee.

All data collected were entered for statistical analysis using SPSS software version 21. Results were expressed as means (\pm SD) and percentages where necessary. Descriptive statistics was used to summarize baseline values and demography. Chi square test was used to compare proportions. A P-value of < 0.05 was considered as statistically significant.

RESULTS

During this study period, a total number of 152 patients with a diagnosis of acute poisoning and envenomations were attended to at the Medical Accident and Emergency department. Table 1 shows the demographics of patients with acute poisoning. There were more males (59, 68.6%) than females (27, 31.4%), with a male to female ratio of 2.2:1. The mean age (SD, min-max) age was 37.8 (18.2, 19-96) years. Age group 18-30 years contained the highest number of cases (43, 50%), followed by those between 41-50years (15, 17.4 %). More than half of the cases in this study were accidental (53, 61.6%). However cases of intentional poisoning were more common with females in age group 18-30years (12, 75.0%). The demographics of envenomations is as seen in Table 2. A total of 66 patients were recorded during the study period, of these 36 (54.5%) were males while 30 (45.5%) were females, with a male to female ratio of 1.2:1. The mean age was 34.7 ± 12.6 , with an age range of 18-83 years. Those between age group 18-40 years (young adults) constituted 69.2% of the victims. Snake envenomations constituted 62.1%.

Pharmaceuticals were the most implicated toxic agents in this study (33, 38.5%), followed by alcohol (20, 23.3%). Pesticides and carbon monoxide poisoning were 13 (15.1%) and 4 (4.7%) respectively Table 3. Among the pharmaceuticals, Analgesics (Opioids and Paracetamol) were the most ingested (13, 31.0%). This was followed respectively by CNS-related drugs (Antipsychotics, Anxiolytics, Antidepressants), Antibiotics and Oral glucose lowering agents (7,16.7%). All cases of

paracetamol ingestion in this study were related to intentional poisoning. Pharmaceuticals were mostly ingested as combination therapy in intentional poisoning (43.0%). Table 4.

No case of intentional poisoning was recorded for patients above 60 years, however associations between intentional poisoning and the age groups did not reveal any statistical difference ($P= 0.122$). Similarly there was no statistical difference when intentional poisoning was plotted against gender ($P= 0.083$) as seen in Table 5. Oral route was the most utilized (72.0%). The case fatality rate was 4.5%.

Table 1: Frequency distribution of patients with acute poisoning according to age groups, sex and circumstance of poisoning in the adult medical emergency.

Demographics	Number of patients, n (Total = 86)
Age (Years)	
18-30	43 (50.0)
31-40	13 (15.1)
41-50	15 (17.4)
51-60	4 (4.7)
>60	11 (12.8)
Mean \pm SD	37.8 \pm 18.2
Range	17 - 96
Sex	
Male	59 (68.6)
Female	27 (31.4)
M:F	2.2:1
Type	
Intentional	33 (38.4)
Accidental	53 (61.6)

Table 2: Demographics of patients with envenomations in the adult medical emergency.

Demographics	n = 66
Age	
18 – 30	33 (50.0)
31 – 40	13(19.7)
41 – 50	12(18.2)
51 – 60	5(7.6)
>60	2 (3.0)
Mean \pm SD	34.7 \pm 12.6
Range	18 – 83
Sex	
Male	36 (54.5)
Female	30 (45.5)
M:F	1.2:1
Type	
Snake bite	61 (92.4)
Scorpion sting	5 (7.6)

Table 3: Percentage distribution of toxic substance related to type of poisoning.

Class	Agent	n
Intentional	Household chemical	5 (5.8)
	Pesticides	8 (9.3)
	Pharmaceutical	12 (14.0)
	Unspecified	8 (9.3)
Accidental	Alcohol	20 (23.3)
	Pharmaceutical	21(24.5)
	Pesticides	5 (5.8)
	Carbon monoxide	4 (4.7)
	Household chemical	1 (1.2)
	Unspecified	2 (2.3)

Table 4: Pharmaceutical agents ingested by patients presenting with acute poisoning in the medical emergency.

Class	Pharmaceuticals	Agents	n (%)
Intentional	Antibiotics	Amoxicillin, Ketoconazole, Ciprofloxacin, Metronidazole	7(16.7)
	Analgesics	Paracetamol, Tramadol, celecoxib, codeine	7(16.7)
	Antimalarial	Artesunate/Amodiaquine,	1(2.4)
	Phosphodiesterase inhibitor	Sildenafil	1(2.4)
	Anticonvulsant	Carbamazepine	1(2.4)
	Anxiolytic	Bromazepam	2(4.8)
	Antihistamine	Loratidine, chlorpheniramine	2(4.8)
	Anti- psychoactive drugs	Risperidone, Chlorpromazine	2(4.8)
Accidental	Analgesics	Paracetamol, NSAIDs, Tramadol	6(14.3)
	Oral glucose lowering agents	Glibenclanide	7(16.7)
	Antihypertensive	Unspecified	1(2.4)
	Insulin	Insulin	2(4.8)
	Antipsychotic drugs	Imipramine	2(4.8)
	Unspecified	Unspecified	1(2.4)

Table 5: Associations between intentional and accidental poisoning, age groups and gender.

Variables	Intentional poisoning	Accidental	P value
Age group(Years)			
18 – 30	19 (57.6)	36 (45.0)	
31 – 40	6 (18.2)	11 (13.8)	
41 – 50	7 (21.2)	14 (17.5)	0.122
51 – 60	1 (3.0)	7 (8.8)	
>60	0 (0.0)	12 (15.0)	
Sex			
Male	17 (51.5)	55 (68.8)	0.083
Female	16 (48.5)	25 (31.3)	

DISCUSSION

A five year profile of cases of acute poisoning and envenomations among adults was evaluated retrospectively in this study. The age group most affected were the young adults less than 30 years. This was similar to other studies within and outside Africa.^[9,10,11,12]

The high prevalence of poisoning in this age group may be related to their natural curiosity, their vulnerability to threat of suicide when affected by stressful factors, increase in the use of recreational drugs and alcohol consumption. Over 60% of poisoning occurs among adolescents and adults aged between 15-59 years, with majority in the average of 21-30 years.^[13] The high

prevalence of males in this study corroborated with studies by Bundotich et al in Kenya^[14] and Sing et al in India.^[15] Also in low and middle income countries of Europe, males account for the highest number of cases of poisoning.^[9] Some studies however showed a high prevalence of females.^[10,11,16] These difference may be due to the fact that age and sex distribution of poisoning burden vary in different geographical regions and time periods, due to the interaction and influence of socioeconomic, cultural and behavioral factors in the general population.^[17]

The predominance of accidental poisoning in this study corroborates similar studies of acute poisoning conducted within Africa.^[2,10,18] but contrasts studies in non-African countries, where intentional poisoning feature prominently.^[11,19,20] Cases of intentional poisoning are usually associated with a higher morbidity and mortality rates. There is however a rising trend of deliberate self-poisoning in developing countries. In this study, the cases of intentional poisoning were highest in age group 18-30years. Although it may occur at all ages, adolescents and young adults are at a higher risk. Determinants of intentional poisoning in developing countries include unemployment, break up in family support system, emotional trauma, economic instability, mental illness and other psychological challenges.^[13] These socioeconomic variables were not determined in this retrospective study. In addition, the high proportion of females with intentional poisoning in this age group may reveal their vulnerability to psychosocial stressors. Pharmaceuticals were the most implicated toxic agents in this study. Geographical variables largely determine the poisonous agents used by patients. In urban settings in Africa pharmaceuticals and pesticides are the most predominant chemicals associated with acute poisoning, unlike rural settings where pesticides were predominant.^[9] Since this was an urban study it may explain why we had more cases of pharmaceutical poisoning than agro-chemical products. Analgesics (opioids and paracetamol) were the most utilized among the pharmaceuticals. There is an increase in the utilization of opioids as recreational drugs. People dependent on opioids are most likely to suffer from an overdose. All the cases of paracetamol toxicity in this study were intentional. The ease in the purchase of these over-the-counter (OTC) medicines, their low cost and availability in households make them easily accessible to patients. Though considered to have a good safety profile, when taken in large doses (>150mg/kg), they can induce hepatocellular necrosis via an initial metabolic phase that produce a reactive metabolite (Benzominoquinone) and an oxidative phase, leading to the release of superoxide and the generation of oxidizing nitrogen and peroxide specie.^[21]

The use of organophosphate pesticides in this study were more intentional than accidental. They are the most common cause of intentional poisoning worldwide.^[13] Pesticide poisoning is a major problem in developing countries. They are easily available in the market and largely used for agricultural, vector control and domestic purposes. In addition, the lack of surveillance systems, insufficient regulations, poor enforcement and maintenance or non-existent personal protective equipment may have contributed to their increased toxic effects in developing countries. They provoke an acute cholinergic crisis by inhibiting cholinesterases. Respiratory failure is the primary cause of death following ingestion of pesticides, either due to their specific-anticholinesterase effects or the non-specific complications of aspiration.^[22] All cases of carbon

monoxide (CO) poisoning in this study were from generator fumes within living apartments. Carbon monoxide has earned its name as 'a silent killer' because it is tasteless, colourless, odourless, and potentially deadly.^[23] It displaces high level of O₂ within the blood thus starving cells and organs leading to damage of vital organs. In resource limited settings where hyperbaric oxygen centres are non-existent, the main stay of treatment remains 100% oxygen therapy. Studies of snake bite envenomations are a major public health problem among communities of the savannah region of west Africa. The composition of the snakes venom shows high complexity and diversity. Clinical features of snake envenomations were present in 33.3% (20/60) of the patients in this study.

The cases of alcohol intoxication in this study were accidental from recreational activities. Alcohol intoxication is both a problem of the old and young. It affects most organs because it is highly diffusible. However it is the neurological, gastrointestinal and cardiovascular manifestations that usually prompts the victims presentation to the emergency departments. The oral route was the most common mode of exposure, with gastrointestinal symptoms predominating, as in other studies.^[18,24] Neurological features included loss of consciousness, confusion and seizures. Most of the patients were managed and discharged.

In conclusion, the findings in this study suggest a need for a more comprehensive health education and general public awareness on the risks and dangers of poisoning. Profiling of epidemiological data of acute poisoning will enhance effective planning for prevention and control of poisoning especially in developing countries, thus decreasing morbidity and mortality. Lastly there should be stricter implementation and enforcement of the laws governing drug regulation and control so as to further limit the access of the general public to prescription only medicines.

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