



Research Article

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Clinical and epidemiologic study on unintentional domestic poisoning at the paediatric service of the Yaounde Gynaeco-Obstetric and Pediatric Hospital

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Abstract

Background: Acute poisoning is one of the possible accidents in a child's life. It is quite recurrent, intentional or not depending to the age group, with some being lethal. The epidemiology of poisoning in children is not well established in our setting. Hence, we judged important to take stock of this situation. **Method:** This retrospective study was centred on epidemiologic characteristics and clinical findings in children hospitalised for non-food-related household poisoning from 2011 to 2015. **Results:** A greater proportion of patients were aged below 5 years (88.8%), with 42.7% within the age range of 12 to 24 months. The most incriminated toxic substances were hydrocarbon derivatives (39.3%), followed by drugs (20.2%), household clean-up products (12.4%). Exposure to toxic substances was mainly at parents' residence (88.8%). The peak frequencies were between 9 and 10 am, and between 7 and 8 pm. It was noticed that measures like giving of milk (31.5%), palm oil (20.2%) were used by parents before seeking medical care, in order to relieve the patients. Predominant clinical findings on admission were digestive (64%), respiratory (44.9%) and neurologic (40.4%). In general, the evolution was favourable (96.0%), with only 1.2% of deaths recorded. The onset of complications ($p=0.041$) and period of hospitalisation ($p=0.001$) was dependent on the nature of the toxic substance. **Conclusion:** Acute poisoning is a non-negligible clinical entity in our setting. Parent sensitization on the risks of exposure to hydrocarbon derivatives, drugs and other household toxic substances could avert the suffering and death in children.

Keywords: Acute poisoning, Toxic substances, Child, Yaounde.

INTRODUCTION

Acute poisoning refers to a pathologic state linked with brief exposure to a toxic substance, mainly by accident^[1]. However, it could be intentional, collective or individual, and affecting persons of all age ranges. It is a real public health problem, representing over 10% of accidental trauma cases in children with incidence above 280 cases/100000 inhabitants^[2]. In the paediatric population, the frequency of each type of accident depends on the child's age^[3]. All age ranges are concerned^[4]. Unintentional poisoning is frequent in children below 5^[3,5]. Drug-related poisoning is predominant over other toxic substances within the age range of 18 to 35 months^[3]. The most frequently noticed toxic substances include petroleum derivatives, drugs and insecticides^[6,7]. In developing countries, most cases require admission to a hospital due to the danger related to the substance consumed^[7] some being lethal^[8] and which makes up about 2% of world mortality rates^[2]. Prevention is the best solution here and is possible if evidence-based efforts are made to ensure the children's survival^[9]. Very few studies on acute poisoning in children have been carried out in our setting; thus, the relevance of this study. Our general objective was to describe the epidemiologic pattern, the clinical manifestations and evolution trends of acute intoxications in children in a tertiary hospital. Specific objectives included to calculate the frequency of acute intoxications in the hospital, to cite the type of toxic substances and intentionality of the poisoning, to enlist the different acts posed before transport to the hospital, to describe the clinical presentation on entry and evolution in the course of admission.

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MATERIALS AND METHODS

The study was carried out at the general paediatric unit of the Yaounde Gynaeco-Obstetric and Paediatric Hospital (YGOPH), between 2011 and 2015. It is a reference teaching hospital for maternal and children health care, situated in Cameroon's capital city. Children are from different horizons, either referred from other health institutions or come directly from the community. The YGOPH possesses among others, an intensive care unit for patients requiring such care. The other patients, according to the complications involved, are catered for in the other admission wards in the general paediatrics unit. The study ran from January 1st 2011 to December 31st 2015, that is, 5 years. Medical records of all children admitted to the paediatrics unit for acute poisoning were included. Files without enough information for the study were excluded. The variables searched for include age, sex, place of residence, type of toxic substance, hour of ingestion, intentionality, clinical signs, acts posed before entry into hospital, complications, duration of hospitalisation and evolution.

Data Analysis

The software Cs Pro version 6.0 was used to type in data, and analysis was done with the software IBM SPSS version 20.0. Qualitative variables were expressed as frequencies while quantitative variables were expressed as means \pm standard deviation or as median with interquartile ranges. The Chi-square and Fisher's tests were used to evaluate the relationship between qualitative variables. If p was less than 0.05, the probability of explaining observed differences by chance was low.

Ethical Considerations

Approval for the study was obtained from the Ethics institutional committee of the Faculty of Medicine and Biomedical Sciences of the University of Yaounde I.

RESULTS

Epidemiologic Data

In all, 108 children were admitted for acute poisoning, giving a frequency of 0.95%. Only 89 medical records were exploitable. The greatest number of children was aged below 5 years (88.8%), with those within the range of 12 to 24 months being the most represented (42.7%). The median age was 22 (IQR: 17-36) months and 49 of them (55.0%) were boys (Table 1). They mainly resided in urban areas (81.4%).

Table 1 : General characteristics of study population

Modalities	Variables	Number	Percentage (%)
Sex	Males	49	55.1
	Females	40	44.9
Age (months)	<12	10	11.2
	12 – 23	38	42.7
	24 – 35	18	20.2
	36 – 47	6	6.7
	48 – 59	7	7.9
	≥ 60	10	11.2
Place of residence	Rural	17	18.6
	Urban	72	81.4
Place of occurrence of intoxication	Family residence	79	88.8
	Out of residence	10	11.2

Toxic Substance and Intoxication Characteristics

As seen in Table 2, 39.3% of patients ingested hydrocarbons; more specifically, paraffin (80.0%), next were drugs (20.2%), mainly neurotropic (27.8%) represented by antiepileptics (16.7%), antidepressants (11.1%), antitussives (22.2%). Household clean-up products were found in 12.4% of cases, mainly household bleach (72.7%). The most frequent place of intoxication was the family residence (88.8%). With regards to hour of intoxication, two peak periods were noted: between 9 and 10 am and between 7 and 8 pm (figure 1). Intoxication was always accidental.

Table 2: Toxic Substance and Parents' attitude after ingestion

Type of toxic substance		Number	Percentage (%)
Hydrocarbons N= 35 (39.3%)	Kerosene	28	80.0
	Petrol	5	14.3
	Engine oil	2	5.7
Drugs N = 18 (20.2%)	Antitussives	4	22.2
	Antalgics	3	16.7
	Anti-epileptics	3	16.7
	Anti-depressants	2	11.1
	Anti-diabetics	2	11.1
	Multivitamins	1	5.5
	Traditional drugs	2	11.1
	Digitalics	1	5.5
Household products N =12.4%	Household bleach	8	72.7
	Detergent	2	18.2
	Caustic soda	1	9.1
	Giving milk	28	31.5
Act posed by parents prior to consultation	Giving palm oil	18	20.2
	Provoking vomiting	5	5.6
	Giving honey	2	2.2
	Others*	7	7.9
	Nothing done	43	48.3

*Others = Raw eggs, lime, much water.

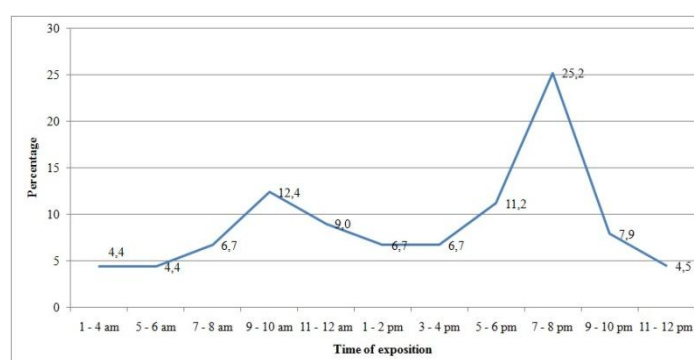


Figure 1: Time of exposition to the toxic agent

Clinical data

Acts posed prior to consultation

A vast majority of patients (95.5%) presented with clinical manifestations upon entry. These were mainly digestive (64.0%), respiratory (44.9%) and neurologic (40.4%). More than half of the parents posed an act prior to consultation (51.7%). This included mainly giving milk (31.5%) and palm oil (20.2%) (Table 2). Patients' ages

had no influence on the particular toxic substance involved. ($p=0.31$); (Table 3).

Table 3: Type of toxic substances ingested with respect to patient median age

Toxic substance	Number	Median age in months (IQR)	P value
Hydrocarbons	35 (39.3)	22 (16 – 30)	0.0301
Drugs	18 (20.2)	30 (20 – 33)	
Household products	11 (12.4)	18 (12 – 48)	
Pesticides	9 (10.2)	19 (12 – 24)	
Cosmetics	6 (6.7)	18 (11 – 48)	
Alcohol	4 (4.5)	66 (36 – 96)	
Others	6 (6.7)	28 (12 – 72)	

Clinical signs on admission

The most frequent were digestive (57, that is 64.0%) and vomiting (82.5%) was at the top of the list (Table 4). The neurological signs were mainly altered states of consciousness (69.4%) and behaviour (27.8%). Respiratory distress (57.5%) and cough (50.0%) were the main respiratory signs.

Table 4: Clinical symptoms registered at admission

Modality	Variables	Number	Percentages
Digestive signs	Vomiting	47	82.5
	Abdominal pain	5	8.8
	Hyper-salivation	9	15.8
	Diarrhoea	2	3.5
	Others (dysphagia, pyrosis, lip ulcers, melena)	5	8.8
	Altered consciousness	25	69.4
Neurologic signs (N=44)	Altered behaviour	10	27.8
	Somnolence	4	11.1
	Convulsions	4	11.1
	Vertigo	1	2.8
	Respiratory distress	23	57.5
	Cough & expectoration	20	50.0
Respiratory signs	Polypnea	19	47.0
	Congestion	17	42.5
	Rhinorrhoea	4	10.0

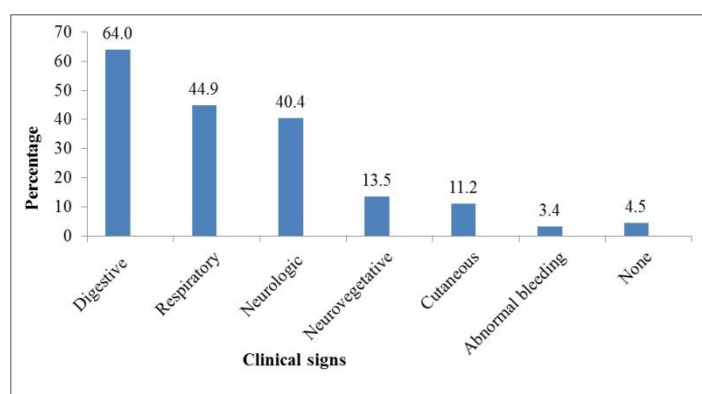


Figure 2: Clinical signs

Evolution in the course of hospitalisation

The appearance of complications was influenced by the nature of the toxic substance ($p=0.041$); (Table 5). Complications were present in 20 patients (22.5%) among which 12 cases of pneumonia (60.0%), 3 cases of nosocomial infections (15.0%), 2 cases of peptic oesophagitis (10.0%), 2 cases of severe respiratory distress (10.0%) and 1 case of prolonged coma (5.0%). The mean hospitalisation period was 3.1 days \pm 2.1 with a minimum of a day and maximum of 8 days. Patients poisoned with hydrocarbons had a longer duration of hospitalisation, giving 5 (IQR: 2-7) days than those by other substances ($p=0.001$). Hydrocarbon and pesticide poisoned patients showed greater risk of developing complications ($p=0.001$). Favourable outcome was noted in 86 (96.6%) patients and 1 death was recorded (1.1%). Like the complications, period of hospitalisation was influenced by the nature of the toxic substance ($p=0.001$); (Table 6).

Table 5: Type of toxic substance and advent (or not) of complications

Type of toxic substance	Complications n (%)	No complications n (%)	P value
Cosmetics	1 (16.7)	5 (83.3)	0.041
Household products	2 (18.2)	9 (81.8)	
Pesticides	3 (33.3)	6 (66.7)	
Hydrocarbons	12 (34.3)	23 (65.7)	
Others	2 (33.3)	4 (66.7)	
Drugs	0 (0)	18 (100)	
Alcohol	0 (0)	4 (100)	

Table 6: Relationship between duration of hospitalisation and type of toxic substance

Type of toxic substance	Number	Median hospitalisation(days) (IQR)	of p value
Hydrocarbons	35	5 (2 – 7)	0.001
Cosmetics	6	3 (1 – 5)	
Alcohol	4	2 (1 – 4)	
Others	6	2 (1 – 4)	
Pesticides	9	2 (1 – 3)	
Drugs	18	2 (1 – 2)	
Household products	11	1 (1 – 3)	

DISCUSSION

The aim of this study was to describe the epidemiologic, clinical aspects, and the immediate outcome of children admitted for acute poisoning at the General paediatrics unit in a tertiary hospital in Yaounde. Unintentional intoxications represented about 1% of admissions. This is consistent with values obtained from a similar study in New Delhi where these were also accidental^[10], but it was clearly less than the rates of 3.03% reported by Sidibé *et al.* 1991 in Mali, and 6.3% by Atanda *et al.* in Congo^[11,12]. However, this prevalence is close to the 1.08% admissions recorded by Sylla *et al.* in 2006 at the CHU Gabriel Touré in Mali^[13].

Boys made up over half of the number of patients (55.0%). This masculine predominance has been described in several studies^[13-17]. The great majority of children (88.8%) were aged below 5 in this study and the most represented was the 12 to 24 months age group (42.7%). At these ages, children explore their environment, unable to discern any danger, with accentuated hand-to-mouth activity. Several studies

throughout the world present this age range as exposed to toxic substances, as exemplified by that done in Mali in 2006 and that of Iran in 2010, where the most affected persons were kids below 5 years of age, 85.4% and 84%, respectively [6,18]. The urban environment is seen to favour this situation. This study reveals that most of the patients (81.4%) resided in Yaounde, a cosmopolitan town with low-grade areas having inhabitants living in precarious conditions and manipulating household chemicals for several aims, without adequately protecting children. In other less favourable settings where parents' occupations may reduce the amount of supervision on children at the age of curiosity, poisoning is also frequent. In Morocco, most poisoned persons come from urban areas [16].

With regards to the place of exposure to toxic substances, the family residence was most noted (88.8%) in our setting. A study carried out in 1991 in Yaounde, revealed that 72.3% of intoxication cases occurred at home [19]. Anti-poison centre reports in France and Morocco reveal similar findings: 86.1% [21] and 76.6% [20] respectively.

As for intoxication hours, we noted two peaks; between 9 and 10 am and between 7 and 8 pm. At these moments, parents' attention is focused on several household chores. Two hour peaks were also noted in Mali; however earlier on 7-11am and 3-7 pm [13]. In Ivory Coast, peaks were situated between 9-11 am and 3-7 pm [22].

In this study, the most prominent toxic substance was kerosene (paraffin). This greenish substance is often used for burning wood and for lighting. Its mint colour and its being conserved in containers for consumable liquids makes it attractive, hence tempting for non-averted persons, particularly children. This substance was preponderant in a study in Pakistan [23]. It is rarely a cause, in developed countries; in the United States, the 2014 annual poisoning report showed that the most frequent cause in children is cosmetics, followed by household clean-up substances and analgesics [24]. In Mali, drugs and household clean-up substances were the most frequent, in that order [13]. In Iran, after drugs, hydrocarbons were identified as part of the main toxic substances [25].

In the present study, the most noted drugs were antitussives. These are freely sold, even by the informal sector and widely used by the entire population, owing to the epidemiology of acute respiratory diseases in our setting. Neurotropic drugs come just after. Like most drugs, sales are not adequately controlled and they are frequently used by aged persons in homes.

The idea of intentional intoxication was absent in this study. In fact, the sample population was practically void of those concerned with intentional poisoning, like in the previous study carried out in Yaounde where all intoxications were accidental [19] and like in Morocco, where 95% were accidental and only 5% intentional, concerning essentially 10-14-year-old individuals [20]. Accidental poisoning would not just be by chance; parents would certainly share in the responsibility either by clumsy behaviour or failure to keep products safe. As such, the accident would occur with the child drinking to quench thirst or just to experience the oral pleasure.

Generally, upon exposure to a toxic substance, parents pose an act before soliciting formal medical assistance for the poisoned patient. This is seen in our study. The acts posed included mainly administration of milk (31.5%) and palm oil (20.2%) as an antidote. In Mali 2006, the first act was giving milk to neutralise the toxic substance or elicit vomiting [13]. According to Nsangou in 2015, in Cameroon, parents preferentially gave palm oil and milk [17]. Not only do these act to slow down appropriate treatment, but they could lead to other harmful effects on health by favouring toxin absorption, aggravating inhalation or prompting oropharyngeal lesions due to provoked vomiting.

Certainly, certain aspects of the clinical manifestation on admission are explained by these manoeuvres, together with the delayed medical treatment, which surely is related to the nature of the toxic substance ingested. There was significance in the relationship between the type of complication and the type of toxic substance, but no link with age or with arrival time at the hospital. In Ivory Coast [22] and Iran [25], clinical signs were mainly neurologic. The duration of hospitalisation of 3.1 ± 2.1 days could be explained by the benign character of certain intoxications, similar to that of 1991 in Bugin study, which showed as mean 3.81 days [19]. However, evolution was favourable in most cases (96.6%) in the present study with rare complications. Limiting our study to the patients hospitalised at the general paediatric unit could have been a source of bias. This study did not take into account patients hospitalised at the intensive care unit where complications would be greater. Pesticides would be an important factor in the transfer of patients to the intensive care unit and as a cause of death, as shown in Morocco [20]. The 1.12% lethality was low compared to findings in New Delhi [10] and the 13.7% found by Bugin in Cameroon, 1991 [19]. These low rates definitely accrue to improvement in equipment and health management plans over the years.

CONCLUSION

Acute poisoning concerns mainly kids aged less than 5 years. Evolution is generally favourable, in spite of the delay to consult because traditional "neutralisation" therapies are employed. It is imperative that parents' attention be called with respect to use of petroleum products and storage of drugs in homes. Parents also ought to be much more vigilant and watchful of their tender-aged children, especially between 9-11am, and 7-8 pm.

Conflicts of Interest

The authors signal no conflict of interest.

Authors' Contribution

NS initiated the draft, NF completed the draft and interpreted the results, CA supervised the writing and proof-read the document. BJB, SF, ME, NS, proof read the draft. All the authors read through the final version of this document.

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