



INTERNATIONAL JOURNAL
OF
PHYTOPHARMACY RESEARCH
www.phytopharmacyresearch.com

PATTERN OF ACCIDENTAL CHILDHOOD POISONING IN UNIVERSITY OF MAIDUGURI TEACHING HOSPITAL: A SUDANO- SAHELIAN REGION OF NORTHERN NIGERIA

Mava Yakubu¹, Baba Usman Ahmadu², Pius Simon³, Timothy Samuel Yerima⁴,
Ibrahim Halima Umaru³, Maspalma Ibrahim Dauda⁴

¹Bingham University Teaching Hospital Jos. Formerly; Department of Paediatrics, University of Maiduguri Teaching Hospital, Maiduguri (UMTH), Nigeria.

²Department of Paediatrics Federal Medical Centre Yola. Formerly; Department of Paediatrics UMTH,

³Department of Paediatrics UMTH,

⁴Department of Pharmacology and Toxicology, Faculty of Pharmacy, University of Maiduguri, Maiduguri, Nigeria.

ABSTRACT

Accidental poisoning in children is an important cause of preventable morbidity and mortality especially in developing countries. Because of this we want to highlight the prevalence of this prevailing condition in North-Eastern Nigeria. This retrospective study was undertaken to review the pattern of childhood accidental poisoning in this environment; Hoping that such information will be used as bases for prevention of accidental poisoning, also for early detection and treatment of cases as well as health education of the communities. The aim of this research is to study the prevalence and the pattern of accidental poisoning among children at the University of Maiduguri Teaching Hospital (UMTH). Data was retrospectively extracted from the case notes of 40 cases of accidental poisoning seen from January 2007 to December 2011. Relevant data extracted includes; age, sex, poison ingested, social class, clinical features and treatment outcome. During the five year period, 45 cases of accidental poisoning were admitted but only 40 case notes were available for analysis. There were 7409 total pediatric admissions during the period under review, giving the prevalence of accidental childhood poisoning at 0.54%. Poisoning was more common among children aged 1-5 years constituting 24 (60%) out of 40 poisoning cases studied. There were 28 males and 12 females giving M: F ratio of 2.3: 1. The majority of the children were from low socioeconomic class (82.5%). Food and kerosene poisoning accounted for 18 (45%) and 12 (30%) of all cases of poisoning respectively. Vomiting 36 (35.3%), diarrhea 16 (15.7%) and cough 14 (13.7%) dominated the clinical features. Six of the patients were in coma at the time of admission and five patients came in shock due to severe dehydration from diarrhea and vomiting. Two deaths were recorded, a six year old with suspected carbon monoxide poisoning and a two-year old that came in hypovolemic shock. Food and kerosene poisoning were the common source of accidental poisoning in Maiduguri and younger children are more vulnerable to poisoning. The provision of education, portable drinking water, improving power generation and supply, as well as, the economic status of the populace and the establishment of poison control center are paramount for government to reduce or eradicate accidental childhood poisoning.

Keywords: Accident, Poisoning, Childhood, North-Eastern Nigeria.

INTRODUCTION

Accidental poisoning in children is a common phenomenon not only in Nigeria but in other part of the world [1-8], it is an important cause of morbidity and mortality [2-5, 9, 10]. The occurrence of accidental poisoning depends on the combine presence of three factors; a vulnerable subject, a poisonous substance and an enabling environment [3, 9]. Poisoning in children generally results from accidental inhalation or ingestion of

toxic substances, intentional ingestion (suicidal) and homicide [2, 4, 11].

There are various classes of poisonous agents reported in literature. These include agricultural chemicals (pesticides, herbicides), plants (mushroom), petrochemicals (kerosene, gasoline), pharmaceutical agents (paracetamol, iron, aspirin tablet etc), contaminated foods and household products such as bleach, alcohols, creams, and potash [2, 3, 6]. The incidence rates of

poisoning and the agents responsible for poisoning vary from place to place [12 – 14]. A prevalence of 0.74% cases of accidental poisoning among children was reported six years ago from University of Maiduguri Teaching Hospital [2], while some workers have reported figures as high as 2% of all hospital admissions [15]. The type of morbidity and mortality experienced following poisoning varies depending on the age of patients and type of poison ingested. While accidental poisoning has been studied extensively in developed countries, reports from developing countries including Nigeria are on the increase. Despite these, there is paucity of data on accidental childhood poisoning in the North-Eastern Nigeria. Therefore, there is need to study the pattern of accidental childhood poisoning in Maiduguri North- Eastern Nigeria which has different demographic, cultural practices and believes. This study will review the profiles of hospital admissions; prevalence of accidental poisoning, the demographic features of the poisoned children, the offending products, clinical features and therapeutics out comes in a Teaching Hospital and also to compare our findings with those in other part of the country and the world at large.

PATIENTS AND METHODS

Study area: The UMTH is a tertiary health centre located in North-Eastern Nigeria and a centre of excellence for Infectious disease and Immunology. The affiliate university has Faculty of Pharmaceutical Sciences with well established Department of Pharmacology and Toxicology. UMTH serves as a referral site for the six North-Eastern states of Nigeria and neighbouring countries of Chad, Cameroon and Niger republic. Maiduguri, the capital of Borno State is located in the semi arid zone. It is a cosmopolitan city with population of about 1.19 million with the Kanuris as major tribe; Islam and Christianity are the major religions.

Study design: Case notes of children admitted to the Emergency Paediatric Unit (EPU) and Paediatric Medical Ward (PMW) of the UMTH with accidental poisoning over a five-year period between 2007 and 2011 were retrieved and reviewed using a structured questionnaire, to document demographic characteristic, social class, symptoms and findings on examination. Others include substance ingested, nature of remedy given

Table 1. Yearly admission of 40 cases of poisoning

Year	No. of cases	Total Paediatric admissions	prevalence rate
2007	10	1636	0.60
2008	08	1599	0.50
2009	12	1262	0.95
2010	04	1557	0.26
2011	06	1305	0.46
Total	40	7409	0.54

Table 2. Age and sex distribution of 40 cases of accidental poisoning

Age (years)	Male n (%)	Female n (%)	Total (%)	Chi-square trend*
<1	3	0	3 (7.5)	-
1-5	18	6	24 (60.0)	0.806
6-10	6	5	11 (27.5)	0.413
11-15	1	1	2 (5.0)	1.000
Total	28 (70.0)	12 (30.0)	40 (100)	-

$\chi^2 = 2.190$ ($p = 0.534$) *Chi-square with Yate's correction

at home and on admission, total duration of stay in the hospital and outcome of management.

Statistics: Information generated from the study was analyzed using SPSS Version 16.0 statistical software. Descriptive data are presented in tables and tests of significance using Chi-square test were done as appropriate: $p < 0.05$ was considered significant.

Ethics: Ethical clearance was obtained from Hospital Research and Ethics Committee

RESULTS

Table 1 shows the yearly admission due to accidental poisoning during the five-year period. There were 40 cases of poisoning out of total paediatric admission of 7409 children giving the prevalence of poisoning at 0.54%. The number of cases admitted each year varied from 10 in 2007 to 6 in 2011.

The children were aged three months to 15 years, with majority of cases observed in children aged 1-5 yrs (60.0%) as shown in Table 2. Eleven (27.5%) out of the 40 cases were children aged 6-10 years, only two cases were seen in children aged 11-15 years. Accidental poisoning was commoner in boys but the difference was not statistically significant ($p = 0.534$).

Table 3. shows types of poisoning

Food poisoning was the commonest type of poisoning encountered accounting for 20 (50%) of the 40 cases. This was followed by kerosene 12 (30%) and then organophosphorus (insecticide and rat poison) in 7.5% of cases.

Table 4 shows the distribution of poison by social class. Majority of the children were from low social classes (82.5%), with 17.5% cases from the upper class. It occurred commonly among male children aged 1-5 years.

Table 5 shows vomiting as the commonest presenting features of poisoning, followed by diarrhoea and cough. One patient presented with torticollis following Plasil® intramuscular injection. Five patients came in shock and three had convulsions. The outcome of treatment showed that 37 (92.5%) were discharged, one of the patient left against medical advice and two death were recorded.

Table 3. Summary of the types of poisoning by age

Types of poison	Age-group (years)				Total no. of cases (%)
	<1	1-5	6-10	11-15	
Food [¥]	1	8	9	2	20 (50.0)
Kerosene	2	10	0	0	12 (30.0)
Iron tablet/syrup	0	1	0	0	1 (2.5)
Metoclopramide	0	1	0	0	1 (2.5)
Organophosphorus	0	3	0	0	3 (7.5)
Herbal medicine	0	1	0	0	1 (2.5)
Carbon monoxide (Generator fumes)	0	0	1	0	1 (2.5)
Diesel	0	0	1	0	1 (2.5)
Total	3 (7.5)	24 (60.0)	11 (27.5)	2 (5.0)	40 (100)

¥ = mostly over night cooked food (contaminated), rotten mangoes, cassava

Table 4. Distribution of poisoning cases by social class with age and sex

Social class©	AGE (years) and Sex								Total (%)
	<1		1-5		6-10		11-15		
	M	F	M	F	M	F	M	F	
Upper	3	0	2	2	0	1	0	0	7 (17.5%)
Lower	0	0	16	4	6	4	1	1	33 (82.5%)
Total	3	0	18	6	6	5	1	1	40 (100%)

Classification of social class by Oyedeji [16].

Table 5. Clinical features of poisoning

Clinical presentation*	Number of cases	Percentage of Cases
Vomiting	36	35.5
Diarrhoea	16	15.7
Cough	14	13.7
Fever	9	8.8
Pneumonia	6	5.9
Coma	6	5.9
Shock	5	4.9
Convulsion	3	2.9
Drawsiness	3	2.9
Pin point pupils	2	2.0
Dilated pupils	1	1.0
Torticolis	1	1.0

*Some patients had more than one clinical feature

DISCUSSION

The finding of accidental poisoning prevalence of 0.54% is in consonance but slightly lower than an earlier report of 0.74% from our centre.² It closely agrees with 0.52% reported from Ile-Ife in South-West Nigeria. This prevalence is however lower than figures of 1% to 2.1% observed in other parts of Nigeria [9, 15] and other countries [3, 6]. The differences in demography and social factors may explain the variation in prevalence between countries and even states within Nigeria. The most common source of poisoning in this report is food, as contaminated cooked food, food plants such as mangoes and cassava (*Tapioca mannihot esculenta*) which is commonly cultivated locally here. This is different from the earlier report from our centre [2], in which kerosene was reported to be the commonest poison with food poisoning coming third. Most centers in Nigeria and even abroad have reported kerosene to be the commonest culprit in childhood poisoning [2, 8, 9, 12, 14]. The reason for

high prevalence of food poisoning may be related to poor hygiene, lack of potable drinking water, proliferation of food vendors that are not supervised by the Health department of Local Government, poor sewage drainage, mixed feedings and some cultural practices of leaving food overnight among other causes. All these on the background of poverty and ignorance may be responsible for this high prevalence of food poisoning. The availability of some local cassava species (*Tapioca mannihot esculenta*) being cultivated, processed and consumed. Poor processing of cassava meals could have predisposed to poisoning.

This review has shown that kerosene poisoning was the second most common accidental poisoning encountered, with prevalence rate of 30% which favourably compares with reports from Southern Nigeria (Nnewi 20%, Lagos 18.8% and Ilesha 14%)⁴ and Malawi 16.7%.¹³ It is however, considerably lower than a figure of 78.8% earlier reported from our centre² and 74.3% observed in Kano,³ also in northern Nigeria. The reason

for the apparent reduction in the prevalence of kerosene poisoning is not clear. It may reflect a positive impact of ready availability of kerosene and generally petroleum products in the past five to eight years in this part of the country and Nigeria generally, making it unnecessary for families to store or hoard the product at home which can be dangerous to inquisitive children. Also public enlightenment through the mass media as well as counseling of affected family members during hospital presentation might have had a positive societal impact of reducing the prevalence of kerosene poisoning.

Organophosphorus poisoning encountered in this study were that of the insecticide and rat poisons, they are marketed extensively in Nigeria and are commonly used against Mosquitoes, Cockroaches and Rats. These can contaminate foods especially if not properly covered leading to poisoning. The locally made rat poison called 'Ota pia-pia' is cheap and readily available in homes. Families with low socioeconomic background commonly use it even for Cockroaches and Mosquitos. With these toxic easily affordable chemicals at home attracts the inquisitive toddlers resulting in accidental poisoning. The prevalence of drug poisoning (5%) in this series is in consonance with 4.2% reported from Kano [3], but much lower than 27.9% reported from Ilorin.⁹ These differences may be because the north is less exploitative of the environment in addition to differences in cultural practices in terms of the use of traditional drugs to orthodox treatment, making the orthodox drugs less available at homes making drug poisoning less. It is worth to mention that studies has shown that children in a developed society are more likely to have accidental poisoning with drugs compare to developing countries [9], Careless keeping of these pharmaceutical products in homes constitutes a hazard for adventurous children who may be attracted by the colours or memory of the sweet taste of some drugs. Poisoning due to herbal concoction was seen in one patient in this review

The highest percentage of accidental poisoning occurred within 1-5 years of age brackets, accounting for 60% of all cases of poisoned children. This agreed with other reports [1, 2, 9]. Toddlers are highly explorative, they reach out for foods, drugs, chemical and other non food substances that are not properly kept away from them with the end result of accidental poisoning. Our report shows that 82.5% cases of poisoning occurred in the low socio-economic class. This further stresses that there is vicious

REFERENCES

1. Adejuyigbe AE, Onayande AA, Seknbanjo IO, Oseni SE. Childhood poisoning at the Obafemi Awolowo University Teaching Hospital Ile Ife, Nigeria. *Niger J Med*, 11(4), 2002, 183-6.
2. Oguiche S, Bukbuk DN, Watila IM. Pattern of hospital admissions of children with poisoning in the Sudano-Sahelian North Eastern Nigeria. *Nig J Clin Pract*, 10(2), 2007, 111-15
3. Belonwu RO, Gwarzo GD, Usman MB. Accidental childhood non-food poisoning in Aminu Kano Teaching Hospital Kano, Northern Nigeria. *Kanem J Med Sci*, 3(2), 2009, 36-39.
4. Orisakwe OE, Egenti L, Orish C. Childhood non-drug poisoning in Nnewi. *Trop Doct*. 30(4), 2000, 209-11.
5. Martin TC, Brinkman W. The spectrum of childhood poisoning in the Caribbean. *Rev Panam Salud Publica*, 12(5), 2002, 313-16.
6. Ab-Rahman AF. Drug and chemical poisoning admissions at a Teaching Hospital in Malaysia. *Hum Exp Toxicol*, 21, 2002, 377-81.

cycle of disease, poverty and ignorance. This has been stressed by other workers both within and outside Nigeria [1, 2, 3, 5, 9].

While the clinical features in this report varied depending on the type of poisoning, vomiting appears to be universal; this may be due to the fact that many ingested poisons can cause gastric irritation coupled with some traditional practices of inducing vomiting at home in an effort to remove the ingested poisons. This may also explain why pneumonia was observed to be common due to likely aspiration that might follow these traditional practices. The mortality rate of 2% herein reported is very low. One was due to food poisoning in which the patient came in hypovolemic shock. Diarrhoea and vomiting leading to dehydration are well recognized causes of childhood mortality. Early recognition and treatment could have prevented mortality in this case; this calls for public enlightenment on the danger of diarrhea and vomiting and re-emphasis on home use of oral rehydration solution. There was no record of mortality among those that had kerosene poisoning, this is not surprising as mortality from kerosene poisoning appears to be lower or are rare [1, 2, 9]. This is because large quantity of the hydrocarbon is rarely consumed before the child begins to cough. This usually alerts the parents and the smell of the kerosene makes them seek early medical attention.

CONCLUSION

Food and kerosene poisoning were the commonest accidental childhood poisoning in Maiduguri and is commoner among children aged 1-5yrs. Low socio economic status contributes to high occurrences of accidental childhood poisoning. Education, economic empowerment, improvement in electric power supply, availability of petroleum products at the appropriate designated places will go a long way in reducing the prevalence of accidental poisoning.

- *Conflict of interest* = None
- *Funding* = Funded by the Authors

ACKNOWLEDGMENT

We sincerely wish to thank the Medical Record Staff of UMTH for their assistance in retrieving the Patients case notes and providing the statistics of total Paediatrics hospital admission for the period of years reviewed.

7. Crowley D, Scallan E, Herbert J, Staines A, Herity B, Tracey J. Carbon monoxide poisoning in the Republic of Ireland. *Ir Med J*, 96(3), 2003, 83-6.
8. Ike IG, Adeoye A. A seven year review of accidental poisoning in children at a Military Hospital in Hafr Al Batin, Saudi Arabia. *Ann Saudi Med*, 21(1-2), 2001, 13-5.
9. Fagbule D, Ojuawo A. Accidental childhood poisoning in Ilorin. *Nig J Paediatr*, 13(1), 1986, 31-5.
10. Alubo SO. Death for sale: a study of drug poisoning and death in Nigeria. *Soc Sci Med*, 38 (1), 1994, 97-103.
11. Daisy H Jr, Simon SV. Forensic analysis of acute fatal poisonings in the Southern District of Trinidad. *Vet Hum Toxicol*, 41(1), 1999, 23-5.
12. Ango SS and Yakubu AM. Accidental childhood poisoning in Zaria. *Nig J Paediatr*, 9, 1982, 105-9.
13. Chibwana C, Mhango T, Molyneux EM. Childhood poisoning at the Queen Elizabeth Central Hospital, Blantyre, Malawi. *East Afr Med J*, 98(6), 2001, 292-5.
14. Ochigbo SO, Udoh JJ, Antia-Obong OE. Accidental childhood poisoning in Calabar at the turn of the 20th century. *Nig J Paediatr*, 31(3), 2004, 67-70.
15. Gupta S, Govil YC, Misra PK, Nath R, Srivastava KL. Trends in poisoning in children: experience at a large referral teaching hospital. *Natl Med J India*, 11 (4), 1998, 166-8.
16. Oyedeji GA. Socioeconomic and cultural background of hospitalized children in Ilesha. *Nig J Paediatr*, 12(4), 1995, 111-7.