PREVALENCE AND CLINICAL MANAGEMENT OF COMMON POISONING IN PEDIATRIC PATIENTS SEEN AT THE UNIVERSITY TEACHING HOSPITAL IN LUSAKA

BY

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A dissertation submitted to the University of Zambia in partial fulfilment of the requirements of the degree of masters in clinical pharmacy

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DECLARATION

I hereby declare that this dissertation represents my own work, and that it has not been previously submitted for a degree, diploma or other qualification at this or any other university.

The work in this dissertation that is not mine but belongs to authors of other materials, I have duly acknowledged the sources. I have equally acknowledged all the information acquired from internet, individuals and institutions.

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SUPERVISOR APPROVAL

On behalf of the University of Zambia (UNZA), I wish to confirm that I supervised MUCHINDU HAMPANGO's dissertation. I further wish to state that to the best of my knowledge, I believe that the aforementioned student actually conducted this research work. I therefore approve that this dissertation by MUCHINDU HAMPANGO be submitted in partial fulfilment for the award of the Master of Clinical Pharmacy (MClin. Pharm)

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CERTIFICATE OF APPROVAL

This dissertation of Muchindu Hampango has been approved as partial fulfillment of the requirements for the award of the Masters in Clinical Pharmacy by the University of Zambia

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ABSTRACT

Acute poisoning is one of the most common causes of increase in morbidity and mortality rate worldwide with 0.3 million people dying every year. It is a major problem in the paediatric population causing 45000 deaths in children and youths under 20 years of age. Mortality in children less than 10 years represent up to 80% of all victims of poisoning. In Zambia information on poisoning is meagre.

The aim of the study was to determine the prevalence, different poisoning types, management and outcome of common poisoning among pediatric patients seen at the main referral hospital in Zambia in order to provide information on evolving trends of poisoning.

A hospital-based cross-sectional study was carried out on all cases of acute poisoning who fitted into the study eligibility criteria admitted to 3 units at the Department of Paediatrics and Child Health of the University Teaching Hospital (UTH) in Lusaka, Zambia from January to May 2015. The 3 units included Emergency Unit, Intensive Care Unit and Admissions ward. Demographic data, data on poisoning, management and outcomes as well as information from the caregiver were collected using a data collection form. Data was then analysed using SPSS version 16.

Acute poisoning constituted 1.0% of the total hospital admissions at the paediatric department. Organophosphates, drugs as well as wild seeds were the most implicated agents accounting for 21%, 21% and 19.7% respectively. Plant poisons and kerosene contributed significantly to the number of cases.

It was found that 60% of patients were not managed according to Standard Treatment Guidelines (STG's), 34.3% employed resuscitation measures or made an attempt to remove the poison and 71% attempted resuscitation plus made an attempt to remove the poison. No deaths were recorded.

The prevalence of acute poisoning in children aged 15 and below is relatively low at the University Teaching Hospital in Lusaka, Zambia. Acute poisoning affected more male

children and resulted in admission mainly due to organophosphates, drugs and wild seeds. There is poor adherence to standard treatment guidelines but the clinical outcome remains very good.

Key words; Prevalence, Poisoning, Paediatrics, Management

DEDICATION

I dedicate this Dissertation to the Almighty God for all the love and support.

I also commit this document to those children that have been victims of poisoning. It is my sanguine wish that the findings and recommendations of this work would reduce the devastating impact of poisoning in future.

ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS AND ACRONYMS

UTH : University Teaching Hospital

PICU : Paediatric Intensive Care Unit

MOH : Ministry of Health

WHO : World Health Organization

REC : Research Ethics Committee

CSO : Central Statistics Office

IRB : Institutional Review Board

ERES : Excellence in Research Ethics and Science

ZEMA : Zambia Environmental Management Agency

DEFINITIONS OF TERMS USED

1. **Poison:** A substance with an inherent property that tends to destroy life or impair health. (Dictionary.com)
2. **Acute poisoning:** Exposure to a poison on one occasion or during a short period of time whose symptoms may develop in close relation to the exposure (Wikipedia).
3. **Chronic poisoning:** Long term repeated or continuous exposure to a poison where symptoms do not occur immediately or after each exposure. The patient gradually becomes ill, or becomes ill after a long latent period (Wikipedia).
4. **Organophosphate:** An organic ester of phosphoric or thiophosphoric acid; such compounds are powerful acetyl cholinesterase inhibitors and are used as insecticides and nerve gases. (Medical Dictionary)
5. **Antidote:** An agent used to neutralize or counteract the effects of a poison. (Dorland's Medical Dictionary for Health Consumers)
6. **Coma:** A state of extreme unresponsiveness, in which an individual exhibits no voluntary movement or behaviour (Dorland's Medical Dictionary)
7. **Pediatric:** Pertaining to preventive and primary health care and treatment of children and the study of childhood diseases (Mosby's Medical Dictionary, 8th Edition, 2000, Elsevier)
8. **Clinical outcome:** Any change in the health status, health-related behaviour, or attitudes of patients after the physicians' intervention (Chest Journal)

9. **Anecdote:** A short account of a particular incident or event of an interesting or amusing nature often biographical. (Dictionary.com)
10. **Exposure:** A state of contact or close proximity to a chemical, pathogen, radioisotope or other substance by ingesting, breathing, or direct contact e.g., on skin or eyes; exposure may be short term, acute or long term (chronic) (Segen's Medical Dictionary, 2012)

CHAPTER 1: - INTRODUCTION

1.1 Background

Poison is defined as a substance which when administered, inhaled or swallowed is capable of acting deleteriously on the body (Olson KR *et al*., 1990). It is defined also as a medicine in a toxic dose (Doull J *et al*., 1990).

Poisoning can cause detrimental effects to the human body and body systems as most toxins tend to cause damage which is sometimes irreversible. Due to their physiology these effects can be even worse in children let alone neonates and infants.

It is estimated that 80% of all victims of poisoning in children less than 10 years old is due to acute poisoning (Joubert, 1990). Most substances implicated in child poisoning and their effects in children can also be a public health problem, however, no deliberate preventive methods have been put in place in the community to stop or address the scourge.

Acute poisoning in children is a public health problem in the United Kingdom accounting for over 140,000 hospital admissions each year (NPIS Report2013/14). It represents a frequent cause of admission in emergency departments and ultimately will increase the work load of health personnel (Lamiream *et al.*, 2002)

Poisoning is one of the most common causes of increase in morbidity and mortality rate worldwide with 0.3 million people dying every year (Thundiyil *et al*., 2008). Acute poisoning caused about 13% deaths in children and youths under 20 years of age in 2004. Africa and low-income and middle-income countries in Europe and Western Pacific Regions have the highest rates (WHO, 2004).

The majority of poisonings are accidental, especially in the under 5 age group, although intentional overdoses and substance abuse are seen in older children (Litovitz *et al*., 1989).

Whether the management of the poisoning was related to the outcomes was what this study endeavoured to look at apart from establishing the prevalence in Zambia. The study intended to establish the trends of poisoning in children and compared its management with that prescribed in the standard treatment guidelines notwithstanding the outcomes thereof.

Penny *et al.,* (2009) describe the basic principles of management of poisoning stating that they depend on the type of poison taken and the clinical condition of the patient. Further, treatment should be aimed at slowing down, reducing or preventing further absorption of the poison and to counteract the effects of the poison already absorbed.

All patients with poisoning should be referred to a specialist after emergency treatment with the initial priority in treating poisoned children being the standard ABC (Airway, Breathing and Circulation) resuscitation approach (Penny et al., 2009). This is as follows:

A: Assess airway patency by looking, listening, and feeling for air movement.

B: Assess the adequacy of breathing by observing ventillatory frequency, use of accessory muscles, breathing sounds and oxygen saturations.

C: Assess the circulation in terms of cardiovascular status (heart rate, arterial pressure, and capillary refill) and the effect of circulatory inadequacy on other organs (mental state, urine output, skin temperature and colour).

In addition, neurological functions as well as core temperature are also assessed as follows;

D: Assess neurological function in terms of:

- Level of consciousness using the alert, voice, pain and unconscious score or the Glasgow coma scale.
- Pupillary size and reaction
- Posture and the presence of any seizure activity

- Bedside blood glucose concentration

E: Record the child's core temperature. Fever suggests poisoning with cocaine, sympathomimetics, salicylates, anticholinergics, and dissociative drugs such as ketamine. The appropriate antidote must be administered expediently (Penny *et al., 2009*).

Table 1: Antidotes used in the management of pediatric poisonings

Toxin	Antidote	Dose
B-blocker	Glucagon	Bolus 0.1mg/kg; infusion 0.07mg/kg/hr
Digoxin	Digoxin-specific antibody (Digibind)	1 vial (38mg) binds digoxin 0.5mg
Ethylene glycol/methanol	Ethanol	10ml/kg loading; maintenance 1-2ml/kg/hr (aim 100mg/dl)
Cyanide	Hydroxycobalamin [Cyanokit ®]	70mg/kg
Organophosphate	Atropine	Test 0.05mg/kg; double dose every 5 min
Iron	Desferrioxamine	10-15mg/kg/h until acidosis resolved
Heavy metals	EDTA	20-30mg/kg/day
Acetaminophen	N-acetyl cysteine	15omg/kg over 15 h 50mg/kg over 4h 100mg/kg over 16h
Opioids	Naloxone	0.1mg/kg max 2mg
Sulphonylureas	Octreotide	1mcg/kg i.v./s.c. 6 hourly
Tricyclic antidepressants	Sodium bicarbonate	1 mEq per kg. aim pH 7.5 – 7.55
Warfarin	Vitamin K	1-5mg 6-8 hourly

(Penny *et al*., 2009)

1.2 Statement of the Problem

Although much evidence has accumulated to explain patterns of poisoning, there is still no much evidence on the prevalence and the relationship between management and poisoning outcomes. The pattern of acute poisoning worldwide shows an increasing trend causing morbidity and mortality in all the victims (Thundiyl *et al.*, 2008). It contributes to 80% of mortalities in children below 10 years (Joubert, 1990). The Prevalence of poisoning in Zambia has not been well documented in the paediatric population. Moreover, no deliberate preventive methods have been put in place to stop and address this scourge.

1.3 Purpose of the Study

The purpose of the study was to determine the prevalence, different types, management and outcome of common poisoning among paediatric patients seen at the main referral hospital in Zambia in order to provide information on evolving trends of poisoning. It was also important to assess the effectiveness of clinical management of poisons and its outcome when managing common poisoning in children.

1.4 Significance of the Study

The study addressed an important issue of poisoning as it relates to children which could be considered as one of the public health problems in a population where there is lack of wide controlled poison education. It aimed at providing vital information on the spectrum of pediatric poisoning, and clinical management profile in pediatric patients.

Prevalence estimates form the basis for informing policy makers and implementers such as Zambia Environmental Management Agency (ZEMA), Police service and to institutions and individual partners in health-care management on measures to take to prevent poisoning in children. Assessment of clinical management and outcomes would help in identifying gaps in the clinical management and ultimately provided better and evidence based outcomes.

The study also served as a guide towards the current patient care practice of child poisoning and the findings would be used for the purpose of advocating for the design of local management protocols and establishment of a poisons information centre or unit.

1.5 Objectives

1.5.1 Main Objective

To determine the prevalence and clinical management of common poisoning in paediatric patients at the University Teaching Hospital (UTH) in Lusaka, Zambia.

1.5.2 Specific Objectives

1. To assess the prevalence of poisoning in paediatric patients
2. To assess adherence to standard treatment guidelines in management of common poisoning.
3. To determine the outcome of common poisoning in paediatric patients.

1.6 Research question (s)

What is the prevalence, clinical management and outcome of common poisoning in paediatric patients at the UTH?

Follow up question

Are Standard Treatment Guidelines (STG's) adhered to when managing poisoning in children seen at the UTH?

1.7 Limitations of the study

The study was cross-sectional, therefore, cause and effect relationships may not be determined. The use of UTH as a study site and the convenience sampling method could not make findings generalisable as they are not representative of all hospitals in Zambia. The findings, however, provide vital information on the spectrum of acute poisoning, and common causes of mortality due to the phenomenon as seen in some of our hospitals. Hence

further studies are needed, preferably cohort or interventional studies involving victims of poisoning to improve its management.

CHAPTER 2: - LITERATURE REVIEW

According to WHO (2004) an estimated 346,000 people died worldwide from unintentional poisoning. In 16 high-income and middle-income countries, poisoning was the fourth biggest cause of unintentional injury after road traffic injuries, fires and drowning (WHO, 2004)

A study conducted in England between 1974 – 81 which looked at 1720 poisoned children aged less than 15 years showed that in the 0-4 age range, more boys were affected as compared to females with a ratio of 1.4:1, in the 5-9 age range the ratio was also 1.4:1 with males being more affected. Among the children aged 10 and above, females were more affected with a ratio of 0.5:1. 60.5% of the children admitted were poisoned with medical products, the authors however only characterized the poisoning episodes as asymptomatic and symptomatic (Lawson *et al*., 1983).

Haghighat and colleagues (2009) carried out a study in Iran in which they looked at the prevalence of poisoning among children. The study was carried out on 463 children in relation to age, gender and route of exposure. Of the affected children, 239 were male while 224 were female. The majority (67.4%) were 5 years old or younger and medicines were the most common type of poison accounting for 54%. Mahmudi *et al* (2013) in their study involving 230 cases whose age ranged from 30 days to 11 years also observed a high frequency (81.7%) of poisonings among children less than 5 years of age. The main cause of poisoning was drugs with males (50.9%) being more affected than females (40.1%). The two studies were also consistent with a study carried out by Tsalkidis and others in 2010 in which the highest incidence of poisonings was among children up to 5 years of age with pharmaceutical drugs being the most frequent poisonous substances responsible. There was also an observation that 17 children, all female, ranging from 11 to 14 years attempted suicide through poisoning.

Jesslin *et al., (*2010) in in a study conducted in India revealed retrospectively case records of poisoning from January 2005 to January 2008 and prospectively from January 2008 to September 2009. This study was carried out in both children and adults. Results showed that in children, accidental poisonings were common affecting boys (64.9%) more than girls (35.1%). The poisonings in children were mostly due to household products accounting for 64.6% of the poisonings.

Gupta *et al* (1998) in India carried out a retrospective study where they reviewed cases of poisoning from poisoning from 3 alternate years (1989, 1991 and 1993). They observed that 185 admissions and 17 deaths during the period under review were due to poison. Like other researchers have also found, Gupta and others found the most frequently affected age to be children 5 years and below. They further observed that the larger number of these were those below 2 years. They found that the major cause of poisonings were non-medicinal compounds contrary to other authors who found the most frequent agent involved to be drugs. They also found that males were more affected than female with a ratio of 2.5:1. Further, 61.6% were from urban areas while 38.3% were from rural areas.

Another study was carried out in Israel by Lifshitz *et al.*, (1994) in which they reviewed retrospectively 26 cases of Carbamate poisoning from the years 1989 – 1992 with ages ranging from 1 to 8 years. Of the reviewed cases, boys were more affected (17) compared to girls (9).

A retrospective study in South Africa reviewed 423 cases of acute poisoning admitted to eight conveniently selected hospitals (Malangu and Ogunbanjo, 2009). It basically concentrated on the gender and profile of patients presenting with acute poisoning but did not look exclusively at paediatrics. The findings showed the age group most affected to be below 12 years of age accounting for 36.9% of cases and that the majority of those affected were

female black Africans. These results suggested that further studies were needed to understand the motivation(s) for this emerging problem especially on the female black African.

Generally, most studies (South African and Indian) covered all age groups and were multi-central in nature, carried out retrospective studies and did not assess whether clinical management contributed to the outcome.

Children under the age of 5 years are the most at risk group for poisoning accounting for 59% of those poisoned in Pakistan (Ayesha *et al*., 2010). Gupta *et al* (1998) estimated the mortality rate of children aged between 1 and 4 years of age to be between 1 and 7 per 100,000 population. The overall UK mortality rate from acute poisoning was 28 per million population in 2009 demonstrating an increasing trend over the previous eight years (Office for national statistics UK, 2011). Nearly one-third of children under the age of 6 years who present with an accidental poisoning will subsequently have a second episode (Litovitz *et al.*, 1989).

The Prevalence of poisoning in the pediatric population of Zambia is not well known. In England, however, suspected poisoning in children results in about 40, 000 annual emergency department attendances with approximately half admitted for observation or treatment (Greene *et al.*, 2005). In the East African Sub-Region, a feasibility study is currently being carried out jointly by the Zambia Environmental Management Agency and WHO whose overall objective is to find a means for improving the provision of poisons centre services in Africa. In Zambia, though, there is no poison centre therefore, it will propel its establishment.

Generally, there has been a widespread study of adult-based toxicology which might be different in the children population making it imperative that a study be carried out on the population. This study will contribute to the knowledge base of poisoning as it characterizes poisoning in children specifically which, if left unchecked, may bring a lot of unwanted

complications for the society at large, the family unit, the child, Health Ministry, and Health Professionals. In England and Wales, a 85% decline in deaths has been shown since 1976 mainly due to interventions like introduction of child resistant containers, reducing pack sizes of some drugs and a more effective management and support provided by the National Poisons Information Service (Hawton *et al*., 2001).The present study was undertaken to determine in children the prevalence, management and clinical outcome, and to compare the data with previous studies across the world.

CHAPTER 3: - METHODOLOGY

3.1 Study Type

The study design that was used in this research was a cross-sectional based study. This study type was used because it provides a spot check on the poisoning profile and their management and the outcomes thereof in Zambia.

3.2 Study Site

The study was conducted at the University Teaching Hospital, Department of Paediatrics and Child Health, the highest referral hospital in Lusaka, Zambia at the Pediatric Emergency unit, Pediatric Intensive Care Unit and Pediatric Admission ward.

3.3 Target Population

All children under 15 years of age presenting with suspected poisoning at UTH from Lusaka.

3.4 Study Population

The study population was all Children under 15 years of age irrespective of their sex presenting with poisoning to the University Teaching Hospital during the study period.

3.5 Study Period

The study period was 4 months, from January to April 2015.

3.6 Sampling Method

The sampling method that was used in the study was the convenience sampling. This method was preferred over the others because it would encompass all children below the age of 15 who presented with poisoning and met the eligibility criteria.

3.7 Sample Size Determination

The sample size was calculated using the formula $N = Z^2 P (100 - P)/e^2$

Where; N = Sample size required

P = Prevalence – 5%

Z = Confidence interval – 95% (1.96)

e = Standard error – 5%

$N = (1.96)^2\ 5\%\ (\ 100\% - 5\%\ )/(5\%)^2$

$= 72.9904$

The actual Sample size was 73. However, in the data collection period 61cases were collected and data analysis was based on the collected sample.

3.8 Data collection and management

Pre-tested data collection forms were used to enhance validity after taking assent/consent from the poisoned children/children's care givers. The demographic details, poison history and clinical presentation were collected from patient/patient care takers using interviews as well as from case sheets. Treatment details were collected from case sheets and it was assessed by using standard treatment guidelines in order to improve reliability. Clinical outcomes of the patient were identified by following the patient from the day of admission till discharge. Toxic agents involved were classified based on their characteristics. The information regarding the circumstances of the poisoning incident was obtained from the caregivers.

3.9 Data Analysis

The data was analysed using IBM SPSS version 16. For descriptive analysis, frequencies, bar charts, pie charts and tables were used. And for inferential analysis a chi-square test was used

for associations and a p- value less than or equal to 0.05 were considered to be statistically significant.

3.10 Eligibility criteria

3.10.1 Inclusion Criterion

a) Age 0-15 years
b) Patients suspected of poisoning
c) Parental/Guardian consent (with assent where applicable for participants below 15 years of age).

3.10.2 Exclusion Criterion

a) Age > 15 years
b) Chronic poisoning
c) Infective food poisoning
d) Refusal to consent/assent

3.11 Ethical Issues

Clearance was obtained from ERES Converge and permission was sought from UTH management to carry out the study. The study did not involve any invasive interventions on patients. Even though there was no direct benefit to the patients, the community at large would benefit from the study.

A detailed explanation of the aim and objectives of the study was given to the care giver and/or child where applicable before enrolment into the study. Thereafter, written informed consent $\pm$ assent prior to data collection was obtained. Further, the caregivers were informed that the exercise would completely be voluntary and that they were at liberty to withdraw at any point during the exercise. Confidentiality of information obtained during the study was

assured and ensured by the allocation of identification codes on the data collection forms instead of participants' names.

CHAPTER 4: - RESULTS AND INTERPRETATION

4.1 Overview

The study investigated prevalence rates and factors that influence the pattern of prevalence, adherence to standard treatment guidelines in management of poisoning as well as reasons for non-adherence including outcomes of poisoning. It also considered the chemical substances involved in every nature of the outcome. Results have been interpreted narratively and figuratively.

4.2 Prevalence rate and patterns

From the total population of 4129 (patients admitted at the paediatrics department during the study period) the calculated sample size was 61. The prevalence rate was 1.5% of the sample population. The commonest causes of poisoning were medicines (21.3%), organophosphates (21.3%), wild seeds (19.7%) and kerosene (14.7%) as demonstrated in figure1.

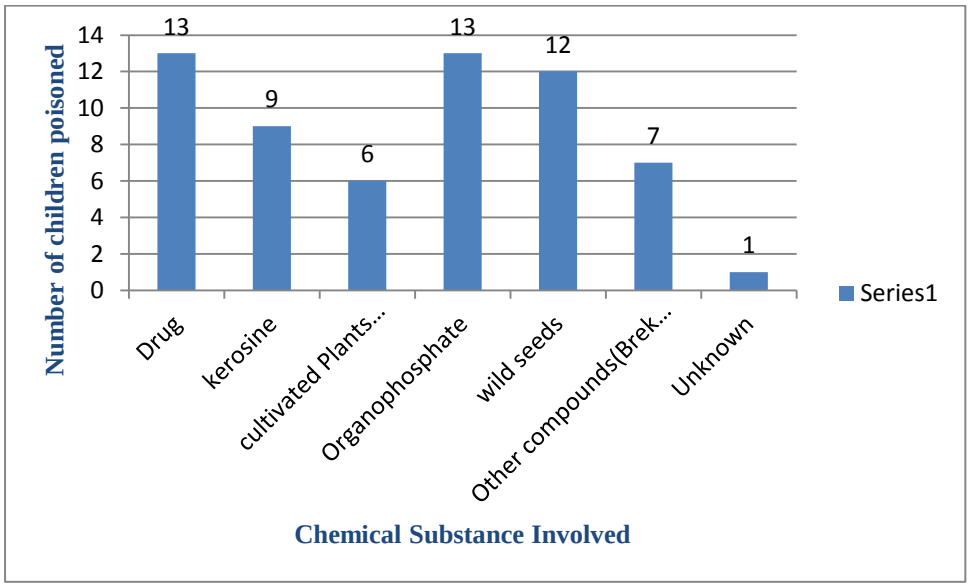

Figure 1: Types of chemicals implicated in children poisoning

Circumstances leading to poisoning were; non-intentional taken by patient (86.7%), non-intentional given by friend (4.9%), deliberate self-harm (6.6%), and deliberate harm by another person (1.6%) as indicated in figure 2.

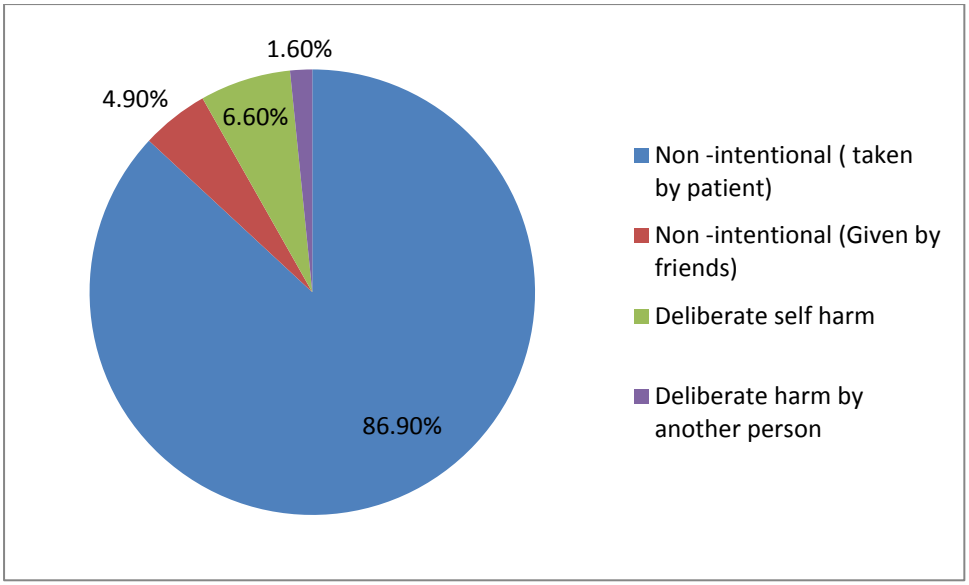

Figure 2: Reasons for poisoning

The reason for most poisonings was attributed to accidental encounters. The cross-tabulation (Table 2) below shows that approximately 87% were non- intentional, this was because patients were not aware that the chemicals they were ingesting were harmful typical of children less than 4 years old. Table 3 reviews that all those that deliberately administered themselves were between 10-15 years old.

Table 2 Chemical substance vs circumstances for ingestion cross-tabulation

		circumstances for ingestion				Total
		Non intention by patients	Non intentional given by friends	Deliberate by self	Deliberate by friends	
Chemical substance	Medicines	10	2	1	0	13
	kerosene	9	0	0	0	9
	cultivated Plants (Elephant plant)	6	0	0	0	6
	Organophosphate	10	0	3	0	13
	wild seeds	11	1	0	0	12
	Other compounds(Break fluid, CO, chlorine, Dettol, jik, silica soil)	6	0	0	1	7
	Unknown	1	0	0	0	1
Total		53	3	4	1	61

Table 3: Age vs circumstances for ingestion cross - tabulation

		circumstances for ingestion				Total
		Non intention by patients	Non intention given by friends	Deliberate by self	Deliberate by friends	
Age	0-4years	33	1	0	1	35
	5-9years	16	2	0	0	18
	10-15 years	4	0	4	0	8
Total		53	3	4	1	61

In terms of prevalence patterns, age was cross tabulated with circumstance for ingestion of poisoning. The most affected age for poisoning was 0 – 4 years old and statistics in table 2 indicate that most (57%) patients experiencing poisoning were in the stated range.

The other characteristic about age was that as age increased incidences of poisoning reduced as displayed in figure 3.

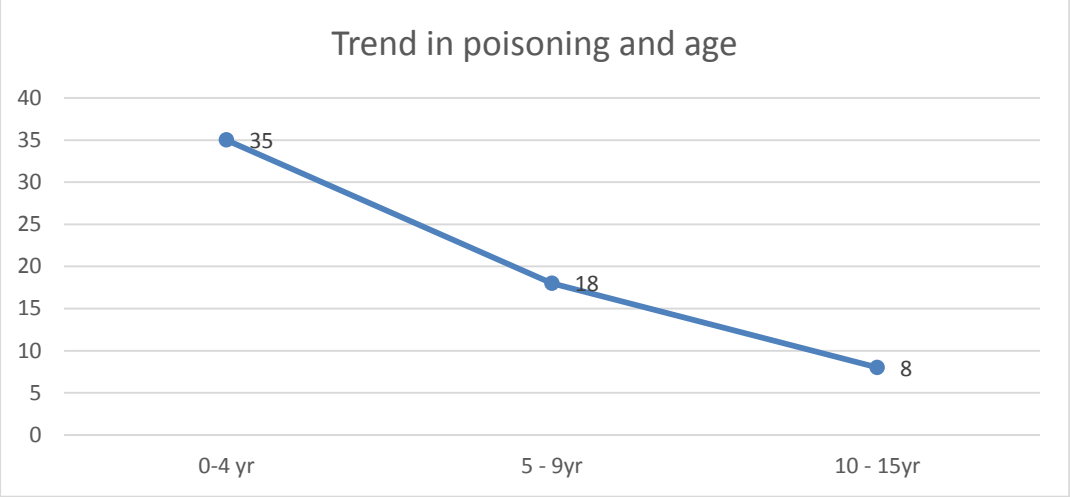

Figure 3: Trend in poisoning and age

Gender factor has indicated males are more vulnerable to poisoning in early years but towards late childhood, the vulnerability is almost the same as females. In fact resultant statistics have shown that the difference is marginal.

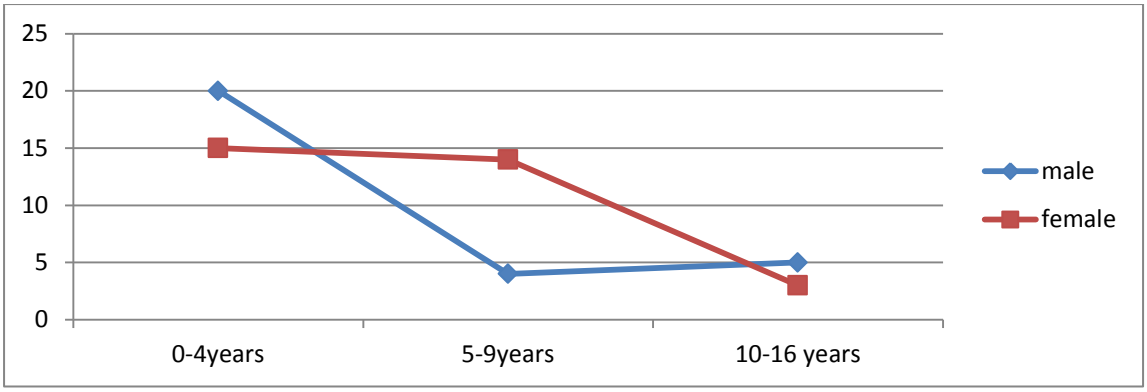

Figure 4: trends variations between male and female factors

With regard to residential areas, 77% of those that experience poisoning were from peri - urban areas of Lusaka. The most common cause of poisoning was wild seeds. Details are in Table 4 below.

Table 4: Chemical substance versus residential category cross-tabulation

		Residential category			
		Urban	Suburban	Peri-urban	Total
Chemical substance	Drug	1	3	9	13
	Kerosene	0	2	7	9
	cultivated Plants (Elephant plant)	0	0	6	6
	Organophosphate	2	3	8	13
	wild seeds	0	0	12	12
	Other compounds(Break fluid, CO, chlorine, dettol, jik, silica soil)	1	1	5	7
	Unknown	0	1	0	1
Total		4	10	47	61

4.3 Adherence to Standard Treatment Guidelines of Management of Poisoning

Levels of adherence examined variables such as non-adherence, adherence to one standard or adherence to two standards. The standards being refered to are outlined under section 3 of the data collection form as: i. emergency rescuscitation measures followed (for those poisoning that required rescuscitation). ii. Attempt made to remove poison (for those indicated). iii. Antidote administered (for those that required an antidote). 70.5% did not adhere to standard

treatment guidelines, 24.6% adhered to one standard treatment guideline while only 4.9% adhered to two standard treatment guidelines (Table 5).

Table 5: Adherence to standard treatment guidelines

		Frequency	Percent
Valid	Non-adherent	43	70.5%
	Adherent to one standard	15	24.6%
	Adherent two standards	3	4.9%
	Total	61	100

Reasons for non-adherence included non-availability of the particular antidote (42.6%), no antidote indicated (19.7%), patient presented late (32.8%), antidote not known (4.9%). Antidotes for organophosphates and drugs were mostly out of stock. On the other aspect patients that took poisonous wild seeds presented late such that it was difficult to follow standard treatment guidelines for poisoning management. Details are in table 6.

Table 6: Chemical substance versus reason for non-adherence to STG's cross-tabulation

		Reason for non-adherence to STG's				Total
		Antidote out of stock	No antidote	Patient presented late	Antidote unknown	
Chemical substance	Drugs	3	7	2	1	13
	Kerosene	0	8	1	0	9
	Cultivated plants	2	0	3	1	6
	Organophosphate	11	1	1	0	13
	Wild seeds	0	0	12	0	12
	Other compounds	3	2	1	1	7
	Unknown	0	1	0	0	1
Total (%)		19 (31.1%)	19 (31.1%)	20 (32.9%)	3 (4.9%)	61 (100%)

Management of poisoning looked at three areas namely, methods of emergency resuscitation, antidote given and attempts made to remove poison based on the nature of the poisoning as some poisoning did not need such intervention. Findings were that those that followed emergency resuscitation were 15%, those that attempted to remove poison 8%, and those that

attempted both to remove poison and follow emergency resuscitation 5% and attempted none 72%. Presentation of statistics are in figure 5.

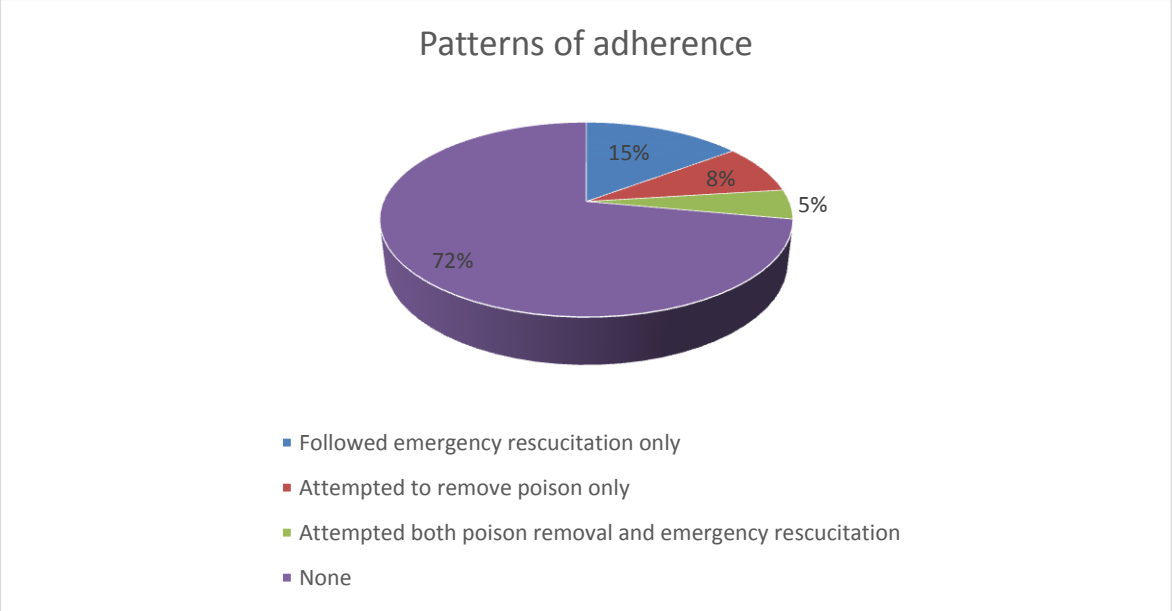

Figure 5: Patterns of adherence

4.4 Outcomes of Poisoning

This part investigated the clinical outcome of patients that presented with poisoning. This was in relation to the nature of the chemical substance involved. The results revealed that all the patients were completely healed regardless of the chemical substance responsible. Statistical data is in Table 9.

Table 7: Chemical substance versus outcome of poisoning cross - tabulation

	Outcome of Poisoning				
		Completely healed	Healed with sequelae	Died	Total
Chemical substance	Medicine	13	0	0	13
	Kerosine	9	0	0	9
	Cultivated plants	6	0	0	6
	Organophosphates	13	0	0	13
	Wild seeds	12	0	0	12
	Other compounds	7	0	0	7
	Unknown	1	0	0	1
Total		61	0	0	61

CHAPTER 5: - DISCUSSION

5.1 Prevalence Rates

The prevalence rate was based on sample population and findings were that out of the total sampled population, only 10.5% of children experienced poisoning. The researcher found no studies that have been carried out at global, regional or local level on prevalence rate of chemical poisoning in children. However, 10.5% rate of poisoning attracts concern because some poisoning lead to death even though findings have indicated that no child died from poisoning.

Findings have revealed that the commonest chemicals implicated were medicines, organophosphates, wild seeds and kerosene. It is worth mentioning that medicines, organophosphates and kerosene are chemicals mostly (56.5%) used in households. This is buttressed by the study conducted by Jesslin *et al.,* (2010) in India which showed that 64.6% of poisoning in children were mostly due to household products; yet pharmaceutical practice emphasises that medicines and other harmful products should be kept out of the reach of children. The fact that there are high incidences of pharmaceutical poisoning implies that this caution is not adequately addressed during instructions on storage and cautions.

Concerning circumstances leading to poisoning, it was established that most poisons taken by patients were not intended (87%). Meanwhile medicines accounted for 18.9% of non-intentional poisoning by patients themselves. The assumption is that the principle of keeping medicines out of reach of children is not being adhered to. Similarly, the percentage of organophosphate poisoning was 18.9% and these are also household pharmaceutical products. Even more worrying is the fact that organophosphates are even more poisonous to humans as compared to medicines since they are intended to destroy prokaryotic cells, thus

emphasis on storage cautions of organophosphates should even be more stringent than medicines.

Deliberate self-administration of poisonous substances was 6.6% and table 3 has indicated that the children involved were aged between 10 – 15 years old. This was in line with a study carried out by Tsalkidis in 2010 in Iran, who observed that females in the age group of 11 to 14 years attempted suicide through poisoning. The findings of the study justify the reason for deliberate self-administration of poisonous chemicals as being for purposes of self-harm.

Demographic variables such as age, residence and gender were investigated and they demonstrated that they had effects on the prevalence patterns of chemical poisoning. Statistics have indicated that children below the age of 4 years were more prone (57%) to poisoning due to their inquisitive nature. The chemicals implicated were pharmaceutical products such as medicines and organophosphates. Furthermore, other studies also demonstrated that majority (67.4%) of children affected by poisoning were below 5 years old and that pharmaceutical products such as medicines were implicated (Haghigh at *et al.,* 2009). These revelations support earlier arguments that the caution of 'keep out of reach of children' is rarely adhered to. On the other hand, results (Figure 03) have revealed that as age increases prevalence of poisoning reduces. This entails that the levels of awareness on poisonous substances increase with age. Thus, it is important that caution is taken in younger children with regard to safe keeping of chemical substances.

In this study, sex (gender) has also been considered to be a factor that influences poisoning patterns. Figure 4 indicated that the age factor in terms of influencing rate of poisoning depended on age range. Regression statistics in figure 4 have indicated that gender had a significant impact. This outcome is supported by the findings that in the range of 0 – 4 years, boys were more affected than girls because they are more inquisitive in nature. Other studies

have demonstrated similar patterns and trends. Factors influencing variations have not been established. Further studies should be carried out which will relate poisoning to gender and psych-developments.

Residence of poison victims also had influence on the prevalence of poisonings and statistics have indicated that 77% of patients come from peri-urban areas of Lusaka. Peri - urban areas are characterised by poor people with low level of education, low income and frequent epidemics (Napier 200, Mulenga 2003, UNL-Habitat 2007). In other words, residents of peri - urban areas are at risk of poisoning due to unhealthy living conditions and ignorance of poisons. This shows why most of them had wild seed poisoning which are easily accessible in the periphery of the city.

5.2 Patterns of Adherence to STGs

Findings have indicated that 70% of health care providers did not adhere to STGs. This approach puts patients at risk of dying. Oddly, there was no patient who died despite this high level of non-adherence because mothers administered unconventional traditional antidote techniques before the child was brought to the facility.

5.3 Reasons for non-adherence

The reasons for non-adherence included antidote being out of stock, no antidote for a particular poison, late presentation of patient to hospital or the antidote was not known by the medical staff. It was observed that in 42.6% of cases, antidotes were not in stock. This entails that antidotes are rarely considered as emergency and vital medicines that should be in stock especially so for children who are vulnerable health wise. In fact, antidotes are not part of the emergency trolley medicines at the University Teaching Hospital. Such a high percentage of out of stock medicines puts children at high risk.

The other factor that influenced non-adherence was late presentation of the condition to health care providers. The attributed factor was that most cases that presented late were associated with wild seeds assumedly from peri-urban areas. These would presumably access UTH much later than those in the urban areas. The challenge with wild seeds is that it is difficult to relate them to standard treatment guidelines because few studies have been carried out in Zambia to identify antidotes for each plant. Similarly, there are no documented antidotes for cultivated plants or kerosene, thus non-adherence is not due to malpractice but little information on antidotes for chemical poisoning experienced in Zambia.

5.4 Outcome of common poisoning

Despite management not being in accordance with standard treatment guidelines, all children survived, maybe because of un-conversional remedies that were given before presentation to the hospital even though it was just anecdotal data. This is opposed to a study done by Malangu and Ogunbanjo, (2009) where they recorded a death rate of 2.4%.

CHAPTER 6: - CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The prevalence of acute poisoning in children aged 15 years and below is low (10.5%) with male children being the most affected. Hospital admissions were mainly due to organophosphates, medicines (drugs) and wild seeds.

There is poor adherence to standard treatment guidelines but the clinical outcome is very good.

While hospital-based data cannot give a conclusive picture of the prevalence, management and outcomes of children poisoning, it has highlighted the magnitude of the problem and evolving trends. The findings of the study suggest that further studies are needed to understand the motivation(s) for this emerging problem and that these should focus primarily on the male child and adolescent female child.

6.2 Recommendations

After analysis of findings, the following are the recommendations;

1. Review and recommend improved poison regulation policies.
2. Establish an information poisons centre/control centre which shall supply up-to-date information on treatment and toxicity to physicians/health care providers and to encourage education and research as part of the program of prevention
3. Implement sustainable epidemiological surveillance and monitoring of poisonings in clinical settings and communities.
4. Make antidotes for common poisoning available in the public health sector especially in the emergency departments.
5. Develop or strengthen community programs that minimize risks of poisoning through public awareness campaigns in order to reduce the morbidity from the eminently preventable problem.
6. Conduct a multi-centre study in order to encompass a wider catchment area.
7. To review the effectiveness of the STG's on poisoning management currently being used.

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APPENDICES

Appendix I. – Approval from Eres converge.

33 Joseph Mwilwa Road
Rhodes Park, Lusaka
Tel: +260 955 155 633
+260 955 155 634
Cell: +260 966 765 503
Email: eresconverge@yahoo.co.uk

I.R.B. No. 00005948
F.W.A. No. 00011697

5th February, 2015

Ref. No. 2014-Sept-002

The Principal Investigator
Mr. Muchindu Hampango
University Teaching Hospital
Dept. of Pharmacy
P/Bag RW 1X,
LUSAKA

Dear Mr. Hampango,

RE: CLINICAL MANAGEMENT AND PREVELENCE OF COMMON POISONING IN PEDIATRIC PATIENTS SEN AT THE UNIVERSITY TEACHING HOSPITAL IN LUSAKA.

Reference is made to your corrections dated 4th November, 2014. The IRB resolved to approve this study and your participation as principal investigator for a period of one year.

Review Type	Ordinary	Approval No. **2014-Sept-002**
Approval and Expiry Date	Approval Date: 5th February, 2015	Expiry Date: 4th February, 2016
Protocol Version and Date	Version-Nil	4th February, 2016
Information Sheet, Consent Forms and Dates	• English.	4th February, 2016
Consent form ID and Date	Version-Nil	4th February, 2016
Recruitment Materials	Nil	4th February, 2016
Other Study Documents	Data Collection Form.	4th February, 2016
Number of participants approved for study	-	4th February, 2016

Specific conditions will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

Conditions of Approval

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.
- All unanticipated or Serious Adverse Events (SAEs) must be reported to the IRB within 5 days.
- All protocol modifications must be IRB approved prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.
- All protocol deviations must be reported to the IRB within 5 working days.
- All recruitment materials must be approved by the IRB prior to being used.
- Principal investigators are responsible for initiating Continuing Review proceedings. Documents must be received by the IRB at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Any documents received less than 30 days before expiry will be labelled "late submissions" and will incur a penalty.
- Every 6 (six) months a progress report form supplied by ERES IRB must be filled in and submitted to us.
- ERES Converge IRB does not "stamp" approval letters, consent forms or study documents unless requested for in writing. This is because the approval letter clearly indicates the documents approved by the IRB as well as other elements and conditions of approval.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of ERES Converge IRB, we would like to wish you all the success as you carry out your study.

Yours faithfully,
ERES CONVERGE IRB

Dr. E. Munalula-Nkandu
BSc (Hons), MSc, MA Bioethics, PgD R/Ethics, PhD
CHAIRPERSON

Appendix II. - Information sheet for consent.

APPROVED
05 FEB 2015
ERES CONVERGE
P/BAG 125, LUSAKA.

Information sheet for consent.

Title of study: The prevalence and clinical management of common poisoning in children presenting to the University Teaching Hospital, Lusaka.

Introduction

I, MuchinduHampango, a Master of Clinical Pharmacy student in the School of Medicine at the University of Zambia, kindly request your participation in the above mentioned study. This study is in partial fulfilment for the award of a Master of Clinical Pharmacy. Before you make up your mind whether to take part in the study or not, I would like to explain to you the purpose of the study and what is expected of you. If you agree to take part in this study, you will be asked to sign this consent form in the presence of a witness.

Nature and purpose of the study

This study is being conducted to determine the prevalence of common poisoning in children and how they are being managed. This is being done in order to estimate the burden of poisoning among children presenting to the University Teaching Hospital.

Procedure of the study

If you agree to participate in this study, we will obtain information using a data entry sheet. Your contact details (telephone number(s)) will be required for easy follow-up.

Possible risks and discomforts

Your child will not be exposed to any unnecessary risks by enrolling into the study.

Possible benefits

The information so obtained will help the child with poisoning to be referred for treatment and the information obtained from the study may help health planners' deal with the disease in other children.

Confidentiality

All the information collected is strictly confidential. Data that will be collected, analysed, and reported on will not include your name and therefore cannot be traced to you or your child.

Voluntary consent

Your participation is strictly voluntary. You will not suffer any consequences if you decide not to participate in this study. You may also withdraw from the study at any time for any reason without consequences to you.

Contact Person

Thank you for considering participation in this study. If you have any questions, concerns and clarifications, please contact Mr MuchinduHampango or ERES CONVERGE IRB on the following addresses respectively;

Mr MuchinduHampango,
The University Teaching Hospital,
Department of Paediatrics and Child Health,
P/Bag RW1X,
Lusaka, Zambia.
Mobile phone Number: 260-979 987 801

ERES CONVERGE IRB
33 Joseph Mwilwa Road
Rhodes Park
LUSAKA
Cell: 0955 155633/4

Appendix III. – Informed Consent form.

CONSENT FORM

Informed Consent Form

The purpose of this poisoning study has been explained to me and I understand the purpose of the study. I further understand that: If I agree to have my child take part in this study I can withdraw him/her at any time without having to give an explanation as taking part in this study is purelyvoluntary.

I _____ **(Names)**

Agree to have my child _____take part in the study.

Signed/Thumbprint Date _____(consent giver)

Signed Date_____

Witness

SignedDate. _____ Researcher)

(Copy to be given to the participant and copy to be kept by researcher)
(Consent form, information sheet, data capture tools e.g. questionnaire, other useful items)

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05 FEB 2015
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P/BAG 125, LUSAKA.

Appendix IV. – Assent form.

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Assent Form

Title of study: The prevalence and clinical management of common poisoning in children presenting to the University Teaching Hospital, Lusaka.

Principal Investigator: Mr. MuchinduHampango

What is a research study?

- A research study is a way to find out new information about something. Children do not need to be in a research study if they don't want to.

Why are you being asked to be part of this research study?

You are being asked to take part in this research study because we are trying to learn more about the extent to which common poisoning are affecting the children population. We are asking you to be in the study because your participation will contribute vital information to help assess the impact of this condition.About *30* children will be in this study.

If you join the study what will happen to you?

- We want to tell you about some things that will happen to you if you are in this study.
- You will be in the study for as long as you are in the hospital.
- Your parents/caregiver with be there with you.

Will any part of the study hurt?

- No- no part will hurt as no body harm will be inflicted.

Will the study help you?

Yes it may in that if you have ingested poisons you will be treated. However, if you have no problem, the study will help you know your brain is ok in structure

Will the study help others?

This study might find out things that will help authorities protect other children from ingesting poison someday.

Do your parents know about this study?

This study was explained to your parents and they said that we could ask you if you want to be in it. You can talk this over with them before you decide.

Who will see the information collected about you?

- The information collected about you during this study will be kept safely locked up. Nobody will know it except the people doing the research.
- The study information about you will be given to your parents and your doctors. The researchers will not tell your friends or anyone else.

What do you get for being in the study?

Referral for treatment of any condition that may be discovered

Do you have to be in the study?

- You do not have to be in the study. No one will be upset if you don't want to do this study. If you don't want to be in this study, you just have to tell us. It's up to you.
- You can also take more time to think about being in the study.

What if you have any questions?

You can ask any questions that you may have about the study. If you have a question later that you didn't think of now, either you can call or have your parents/guardian contact:

Mr MuchinduHampango,
The University Teaching Hospital,
Department of Paediatrics and Child Health,
P/Bag RW1X,
Lusaka, Zambia.
Mobile phone Number: 260-968 485 986
OR
ERES CONVERGE IRB
33 Joseph Mwilwa Road
Rhodes Park
LUSAKA
Cell: 0955 155633/4

What choices do you have if you say no to this study?

You can still be seen at the University Teaching Hospital for your condition.

Other information about the study.

- If you decide to be in the study, please write your name below.
- You can change your mind and stop being part of it at any time. All you have to do is tell Mr. MuchinduHampango. It's okay. The researchers and your parents won't be upset.
- You will be given a copy of this paper to keep.

Will you take part in this study?

☐ Yes, I will be in this research study. ☐ No, I don't want to do this.

Child's name	signature/thumb print	Date
Guardian	signature/thumb print	Date
Person obtaining Assent/Researcher	signature	Date

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Appendix V. – Child Poisoning Data Collection Form.

Child Poisoning Data Collection Form

Title of study: The prevalence and clinical management of common poisoning in children presenting to the University Teaching Hospital, Lusaka.

Instructions: Kindly TICK or CHECK box where applicable. Data should only be collected after the consent form has been signed by the patient or next of kin.

Date of enrollment (dd/mm/yyyy) / /

Client ID/Study No:

Age:

Date of birth (dm/yyyy) / /

Home address of Client/Caregiver:
(No. and street name)

Residential Area

Cellphone

1 Sex Male..... ☐
Female..... ☐

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2 Age

≥ 5..... ☐
5 – 9..... ☐
10 – 15..... ☐

3(a) What is the occupation of the mother/parent1/guardian1?

Section 2: Chemical Substance

4 (a) **Whatchemical substance did the child ingest?**
(If more than one check all ingested)

Kerosene..... ☐

Acid ..... ☐

Herbs ..... ☐

Drug..... ☐

Carbon Monoxide..... ☐

Organophosphate..... ☐

Alcohol... ..... ☐

Other - please specify .....

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4(b) What was the intended use of the chemical substance?

Mark one box only in each column

	Check
Industrial.....	☐
Cooking.....	☐
lighting.....	☐
Other - please specify	

4(c) What was the source of the chemical substance?

Mark one box only in each column

	Check
Home.....	☐
Friend.....	☐
Other - please specify	

4(d) Circumstances for ingestion

Mark one box only in each column

	Check 1
Deliberate Self Harm	☐
Deliberate(Homicidal).....	☐
Non-intentional (Taken by patient).....	☐
Non-intentional (given by sibling/friend).....	☐
Other (specify)	

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Section 3: Management and Outcomes

6 **Adherence to STG poison management guidelines**
(If no specify reason)

Emergency rescuscitation measures followed ..... ☐.....☐

Attempt made to remove poison..... ☐.....☐

Antidote administered?..... ☐.....☐

Reason.....

7(a) **What was the Primary outcome?**

	Check
Completely healed.....	☐
Healed with sequelae.....	☐
Died.....	☐

Thank you for your time.

Please return this form to the school in the enclosed envelope.

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05 FEB 2015
ERES CONVERGE
P/BAG 125, LUSAKA.

Appendix VI. – Letter of permission to conduct research.

REPUBLIC OF ZAMBIA
HEAD
CLINICAL CARE
29 JUL 2014
UNIVERSITY TEACHING HOSPITAL
P/BAG RW 1X LUSAKA

UNIVERSITY OF ZAMBIA
SCHOOL OF MEDICINE
PHARMACY DEPARTMENT

Telegram:	**UNZA, Lusaka**	**Telephone:**	
Telex :	**UNZALU ZA 44370**	**Deans Office: 252641**	
P.O. Box:	**50110**	**Departmental Office: 257635**	

To,

The Head Clinical Care

UTH

28/7/14

Re: Mr. Muchindu Hampango; Computer No. 512807770

This is to inform you that the above named is a Masters' student presently in 3rd Year of his Masters in Clinical Pharmacy, UNZA.

Mr.Muchindu's research project is titled, "Clinical Management and Prevalence of common poisoning in paediatric patients at UTH."

As a department we seek your approval for the candidate to access, Paediatric wards, UTH, to enable him to carry out the research.

We look forward to working together to improve patient safety and overall care.

Sincerely,

Dr Lavina Prashar

Head; department of Pharmacy

Appendix VII. –Approval letter from Assistant Dean (Postgraduate).

THE UNIVERSITY OF ZAMBIA

SCHOOL OF MEDICINE

P.O Box 50110
Lusaka, Zambia

Telephone : +260211252641
Telegram: UNZA, Lusaka
Telex: UNZALU ZA 44370
Email: assistantdeanpgmedicine@unza.zm

28th July, 2014

Mr Muchindu Hampango
Department of Pharmacy
School of Medicine
UNZA
LUSAKA

Dear Mr. Hampango,

RE: GRADUATE PROPOSAL PRESENTATION FORUM

Having assessed your dissertation entitled **"Clinical Management and Prevalence of Common Poisonings Pediatric Patients Seen at the University Teaching Hospital in Lusaka",** we are satisfied that all the corrections to your research proposal have been done. The proposal meets the standard as laid down by the Board of Graduate Studies.

You can proceed and present to the Research Ethics.

Yours faithfully,

Dr. S.H. Nzala
ASSISTANT DEAN, POSTGRADUATE
CC: HOD, Pharmacy

UNIVERSITY OF ZAMBIA
SCHOOL OF MEDICINE
23 JUL 2014
ASSISTANT DEAN (PG)
P.O. BOX 50110, LUSAKA

ATTACHMENTS

Standard Treatment Guidelines extract on poisons - Zambia

14
POISONING

Definition
This is the exposure by ingestion, inhalation or other means of a substance capable of causing harm to the body.

Clinical features
The patient may present a variety of symptoms ranging from mild to serious ones like the loss of consciousness.

Diagnosis
- Assess for vital signs
- Ascertain as far as possible, the nature and quantity of the poison and when it was taken.

14.1 MANAGEMENT

Management depends on the type of poison taken and the clinical condition of the patient. Treatment is aimed at slowing down, reducing or preventing further absorption of the poison and to counteract the effects of the poison already absorbed.

All patients with poisoning should be referred to a specialist after emergency treatment.

Emergency resuscitation measures should be taken in the following circumstances:

a) Obstructed airway
   - Pull the tongue forward
   - Remove dentures, foreign bodies (e.g. food) and oral secretions
   - Hold the jaw forward and insert an oropharyngeal airway if possible

   - Put the patient in a semi-prone position with head down to minimise the risk of inhaling vomit

b) Inadequate respiration
   - Give continuous oxygen
   - Apply assisted ventilation with an ambu bag or mouth to mouth or intubate and do mouth to tube respiration.
   - Do not use respiratory stimulants as they cause harm

c) Hypotension
   - Keep patient in a position with his head downwards by elevating the foot of the bed
   - Administer 0.9% sodium chloride intravenously

d) Recurrent fits
   Control with diazepam, adults; 5-10mg intravenously stat, children; 0.2-0.3mg/kg intravenously stat. Repeat as necessary

e) Removal of poison from the stomach

Gastric emptying carries the risk of the victim inhaling gastric contents. The benefit of the procedure should therefore be weighed against this risk. The procedure should not be performed in the following circumstances:
- When corrosive substances (e.g. acids, alkalis and petroleum products) have been swallowed.
- When there is marked hypothermia (less than 300C)
- When the amount of poison swallowed is minimal
- If poison was ingested more than 2 hours earlier (except in the case of poisoning with salicylates, tri-cyclic anti-depressants and beta-blockers)

Procedure
To remove poison from the stomach, two methods may be used:
- Inducing vomiting by giving:
  - Ipecacuanha syrup, adults; 30ml, children above 1 year; 15ml, children below 1 year;

10ml followed by a glass of water. Repeat after 20 minutes if necessary.
- Gastric lavage
  If done in an unconscious patient, a cuffed endotracheal tube should be passed to prevent aspiration of stomach contents into the lungs.
  Reduction of absorption of poison

After vomiting has occurred:
- Activated charcoal; 50g mixed with 400ml water in a bottle and shaken well. Administer the suspension in a dose of 5ml/kg. Repeat every 4 hours. Total dose of 100g for adults, if necessary
- Magnesium sulphate mixture or magnesium hydroxide mixture; 50ml to avoid constipation
- Milk, cooking oil or beaten raw egg may also be given in the absence of activated charcoal, to delay absorption of the poison

14.2 TREATMENT OF SPECIFIC COMMON POISONING

14.2.1 Aspirin and other salicylates

Treatment
- Induce emesis with ipecacuanha, unless respiration is depressed
- Give activated charcoal
- If respiration is depressed, do airway-protected gastric lavage
- Gastric emptying is effective up to 4 hours after ingestion of poison

14.2.2 Carbon monoxide

Treatment
- Remove patient from further exposure

- Give oxygen for several hours
- Maintain blood pressure and normal body temperature
- To reduce cerebral oedema, give 20% mannitol, intravenously 5ml/kg body weight over 20 minutes and a corticosteroid intravenously or intramuscularly 4 hourly (e.g. prednisolone, 1mg/kg body weight dexamethasone, 0.15mg/kg body weight or hydrocortisone, 4mg/kg body weight)
- Control convulsions or hyperactivity with diazepam, 0.1mg/kg body weight by slow intravenous or per rectum

14.2.3 Ethanol

Treatment
- Remove unabsorbed ethanol by gastric lavage or inducing emesis with ipecacuanha syrup
- Give activated charcoal
- Maintain adequate airway
- Maintain normal body temperature
- If patient is hypoglycaemic give dextrose 50%, followed by 5% intravenously
- May need Vitamin B compound, if chronic alcohol abuser

14.2.4 Insecticides

14.2.4.1 Organochlorine

Treatment
- Remove patient from source of poisoning and remove contaminated clothing
- Give ipecacuanha syrup
- After vomiting give activated charcoal followed by gastric lavage with 2 – 4 litres water (adult dose)

- Give a laxative such as magnesium hydroxide
- Do not give milk, fats or oils as they will increase absorption of the poison
- Scrub the skin with soap and cold water to remove skin contamination
- Give artificial respiration with oxygen if there is respiratory depression
- Give diazepam, 10mg slow intravenous or phenobarbitone, 100mg intramuscularly to control convulsions, hyperactivity or tremors

Organophosphates and carbamate

Treatment
- Remove patient from source of poisoning and remove contaminated clothing
- Establish airway and give artificial respiration if necessary
- Remove excess bronchial secretions by suction
- Give ipecacuanha syrup or start gastric lavage Give atropine, adults; 2mg intravenously/ intramuscularly stat , children; 100-200mcg intravenously/intramuscularly/orally every 3 – 8 minutes until signs of atropinisation appear (hot dry skin, dry mouth, widely dilated pupils and fast pulse)

14.2.5 Paraffin, petrol and other petroleum products

Treatment
- Prevent the substance from entering the lungs to avoid damage to tissue
- Do not induce vomiting
- Do not do gastric lavage
- Look out for pulmonary oedema and chemical pneumonitis and treat accordingly

14.2.6 Paracetamol poisoning

Clinical features
Liver damage may result in paracetamol overdosage. The damage occurs within a few hours of ingestion.

Treatment
- Keep the patient quiet and warm
- Induce emesis with ipecacuanha syrup
- Where there is depressed respiration use airway-protected gastric lavage
- N-acetylcysteine, 20% solution, orally 140mg/kg as a loading dose, followed by 70mg/kg every 4 hours for 3 days. It may be necessary to administer through a nasogastric tube
- Dextrose, 5% intravenously for the first 48 hours
- Phytomenadione, 1– 10mg intramuscularly if the prothrombin time ratio exceeds 2.0
- Do not force diuresis

14.2.7 Chloroquine poisoning

Clinical features
Characterised by blurred vision, tinnitis, weakness, haemoglobinuria, oliguria, low blood pressure, shock, convulsions, cardiac arrest

Treatment
- Induce emesis
- Stomach wash (air-way protected gastric lavage, if respiration is depressed)
- Give activated charcoal
- Treat symptomatically

14.2.8 Mushroom or other foods poisoning

Clinical Features
There will be abdominal pain, nausea, vomiting, and diarrhoea.
Shock, in severe cases

Treatment
Symptomatic:
- Bed rest
- Keep patient warm
- Stomach wash using normal saline
- Give Oral Rehydration Salts (ORS) or intravenous fluids to re-hydrate
- If no improvement refer to specialist

14.2.9 Snake Bites

Treat all snake bites as an emergency

Clinical features
- Pain
- Swelling
- Tissue necrosis
- Regional lymph node swelling
- Haemorrhagic symptoms; bleeding at wounds site
- And other parts of the body

Danger signs
- Drowsiness
- Slurred speech
- Excessive oral secretions
- Difficulty in breathing
- Neurological signs

Treatment
- Immobilise limb and keep slightly elevated

- Administer tetanus toxoid
- Dextrose 5% in saline intravenously
- Treat shock
- Vitamin K, 1-10mg intramuscularly
- Anti-snake venom, if available
- Transfer patient to specialist

Prevention
- Wear protective shoes
- Clear bushes near dwelling places
- Avoid walking on dark paths