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Trends of Acute Poisoning Cases Occurring at the Kenyatta National Hospital, Nairobi, Kenya

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A retrospective study of poisoned patients admitted at Kenyatta National Hospital (KNH) over the period between January 2002 and June 2003 was carried out. KNH is a national referral and university teaching hospital and patients are admitted from all parts of Kenya. The results of the study are therefore expected to mirror closely the situation in the rest of the country. Data analysis showed that 58.9% of poisoned patients were males. Pesticides and household/industrial chemicals, the two most important poisoning agents, accounted for 43% and 24% of poisoning, respectively. Organophosphates and rodenticides were the two most common pesticides accounting for 57.4% and 31% of poisoning, respectively. Kerosene accounted for 66% of poisoning with household agents. Self-poisoning was prevalent in the age bracket 21-30 years (70.7%) while accidental poisoning, mostly with kerosene, was prevalent in the age group 0-5 years (83.9%). The overall mortality rate from poisoning was 7.0%.

Key words: Poisoning in Kenya, organophosphates, kerosene

INTRODUCTION

Every year around the world, hundreds of thousands of people are exposed to poisoning. The exact numbers of those poisoned each year are not known, even for countries that have a good network of Poison Control Centres such as the United States of America, Britain and Canada, because there are many minor cases of poisoning which present with transient symptoms and often go unreported [1-3]. An analysis of poisoning in nineteen Kenyan hospitals between 1991 and 1993 showed that a far greater number of people (27.2%) were poisoned by organophosphate pesticides [2]. Some of those poisoned had the motive of committing suicide, but the majority of patients who died were handling the pesticide as unsophisticated users. A further analysis of the 1888 poisoned cases showed that children between the ages 0 and 14 (40.1%) were affected more than late teenager individuals (19.1%) and adults (33.6%). However, those aged 15 years and above had the highest death rate (52.9%) [2,3]. Furthermore, analysis of childhood poisoning revealed that children aged 0-5 years accounted for 29.8% while those aged 6-14 years accounted for 10.2% of the poisoning cases recorded. In the 0-5 age group, kerosene, medical drugs and organophosphates accounted for 41.1%, 23.8% and 15.2% of poisoning cases, respectively. The study recommended that preventive measures targeted at children must focus on these classes of poisons which together accounted for approximately 80% of poisoning cases in children [3].

In Kenya, there have been press reports of poisoning cases in the community arising from the consumption of illicit brews and contaminated grain. In November 2000, there were 174 recorded cases of methanol poisoning which resulted in the deaths of 51 people [4]. In 2004, there were 317 cases of aflatoxin poisoning in the Eastern and Central provinces of Kenya in which 125 people died. The outbreak resulted from widespread aflatoxin contamination of locally grown maize stored under damp conditions [4]. In the Kenyatta National Hospital (KNH), a total of 447 cases of poisoning were reported in the year 2004 [5]. These local reports, though important, do not indicate the circumstances leading to poisoning, the most vulnerable age groups and the routes of

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administration. The present study was therefore aimed at collecting data on these aspects of poisoning.

MATERIALS AND METHODS

Approval for the study was obtained from Kenyatta National Hospital Ethics and Research committee (Reference number KNH-ERC/01/2612). The study was carried out using KNH medical records covering the period January 2002 to June 2003. The documents reviewed consisted of all poisoning patients' files for the stated period.

A total of 458 patients' files were reviewed. The information mined from the files included: patient's age, sex, name of the poison, circumstances of poisoning and the outcome of poisoning. The relevant data were entered into a designed data collection form before it was transferred to Microsoft Excel (Microsoft Corporation© 2010) for analysis.

RESULTS

A total of 463 patient files were retrieved. However, 5 files were excluded from the study because they had incomplete records. The remaining 458 patients consisting of 58.9% males and 41.1% females were enrolled into the study. Figure 1 shows the distribution of poisoning cases by age and sex. Most poisoning cases occurred among young adults (ages 21-30) followed by children aged 0-5 years.

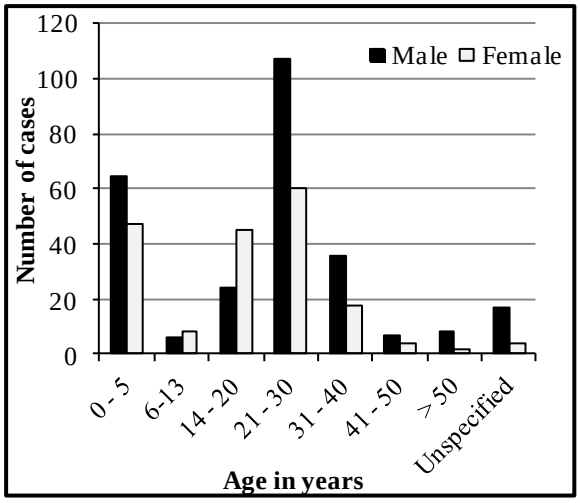

Figure 1. Distribution of poisoning cases by age and sex.

Table 1 shows that the most common type of poisoning was by pesticides (43%) followed by household agents (24%) and prescription drugs (14%). Poisoning using unknown substances accounted for 7% of the cases.

Analysis of the pesticides used in poisoning (Table 2) revealed that organophosphates accounted for the bulk (57.4%) of poisoning cases, while rodenticides resulted in 31% of the cases. The major organophosphate encountered was diazinon even though poisoning cases as a result of amitraz also formed a significant portion.

Table 1: Poisoning cases

	Age in years									
Poison	**0-5**	**6-13**	**14-20**	**21-30**	**31-40**	**41-50**	**> 50**	**Unspecified**	**Total**	**%**
Pesticides	14	1	37	108	23	6	2	6	197	**43**
Household and Industrial chemicals	71	1	4	23	8	0	0	2	109	**24**
Prescription drugs	8	3	18	21	8	1	4	2	65	**14**
Plants	7	1	1	4	0	0	1	0	14	**3**
Biological toxins	6	7	7	9	7	0	3	2	41	**9**
Unknown	1	0	3	9	9	2	1	7	32	**7**
Total	**107**	**13**	**70**	**174**	**55**	**9**	**11**	**19**	**458**	
%	**23.4**	**2.8**	**15.3**	**38**	**12**	**2**	**2.4**	**4.1**		**100.0**

Table 2: Types of pesticides poisoning

Cases	Age in years									
	0-5	**6-13**	**14-20**	**21-30**	**31-40**	**41-50**	**> 50**	**Unspecified**	**Total**	**%**
Organo-phosphates	7	0	16	64	17	3	2	4	**113**	**57.4**
Amitraz	1	0	0	7	2	0	0	0	**10**	**5.1**
Rodenticides	4	0	19	32	3	1	0	2	**61**	**31**
Others	2	1	2	5	1	2	0	0	**13**	**6.6**
Total	**14**	**1**	**37**	**108**	**23**	**6**	**2**	**6**	**197**	
%	**7.1**	**0.5**	**18.8**	**54.8**	**11.7**	**3**	**1**	**3**		**100.0**

A breakdown of the household and industrial agents used as poisons is listed in Table 3. It shows that majority (66%) of the poisoning cases arising from household and industrial agents were due to kerosene. Furthermore, most of the kerosene poisoning cases (89%) occurred in the 0-5 years age group.

Figure 2 shows the trends of type of poisoning with age. It was revealed that most suicidal cases of poisoning were observed in individuals in the 21–30 years age bracket, with more males involved compared to females. Poisoning at ages 0-5 years were mainly accidental. Medicinal drug related poisoning as a result of overdose or allergic reactions were common in children aged 0-5 years.

Commuter cases refer to poisoning cases encountered while travelling, whereby patients presented with sedation and temporal amnesia. This was most likely intentional malicious poisoning with psychotropic substances.

Table 3: Types of household and industrial agents

Cases	Age in years									
	0-5	**6-13**	**14-20**	**21-30**	**31-40**	**41-50**	**> 50**	**Unspecified**	**Total**	**%**
Kerosene	64	1	1	6	0	0	0	0	**72**	**66.0**
Corrosives: acids and alkalis	4	0	1	2	2	0	0	2	**11**	**10.1**
Carbon monoxide	0	0	1	2	1	0	0	0	**4**	**3.7**
Methanol	0	0	0	3	0	0	0	0	**3**	**2.8**
Others	3	0	1	10	5	0	0	0	**19**	**17.4**
Total	**71**	**1**	**4**	**23**	**8**	**0**	**0**	**2**	**109**	
%	**65.1**	**1.1**	**3.7**	**21.1**	**7.3**	**0**	**0**	**1.8**		**100.0**

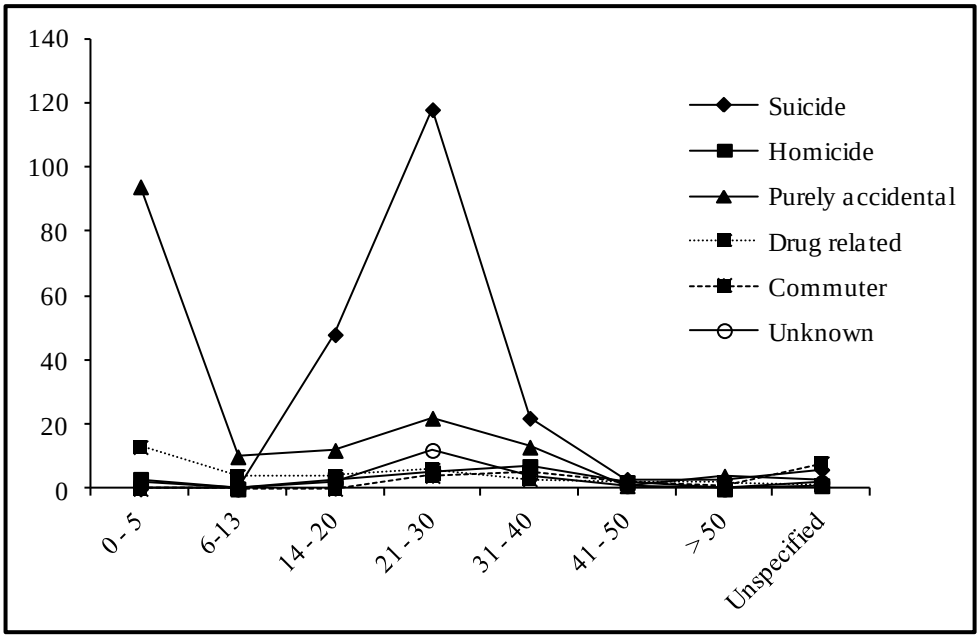

Figure 2. Trends of circumstances of poisoning by age.

Table 4 shows an analysis of the routes of administration used in the poisoning cases considered. Oral ingestion was the most frequent, accounting for 93.4% of the cases. The least used route was the topical route (0.4%).

Table 4: Routes of administration

Route	No. of patients	%
Ingestion	428	93.4
Inoculation (snake bites and insect stings)	19	4.2
Parenteral (IM or IV)	5	1.1
Inhalation	4	0.9
Topical	2	0.4
Total	**458**	**100**

DISCUSSION

Poisoning in Kenya is common and trends of poisoning have not changed much in the past 10 years just like in other countries [6]. In Canada for instance, poisoning ranks next to falls and motor vehicle collisions as the third most frequent type of injury leading to hospitalization [6].

In our study there was a male predominance (58.9%) in poisoning cases. A study by Gupta *et al.* showed a similar pattern which followed the studies done at Allahabad, Rohtak, and Srilanka [7-10]. The higher incidence may be because males are more exposed to stress, strain and occupational hazards compared to females. However, female predominance in poisoning cases has been reported in Imphal and Maharashtra [10].

The study showed that the most common poisoning agents were pesticides (43%) and the bulk (57.4%) of these pesticides were organophosphates while 31% were due to rodenticides. Poisoning with agricultural chemicals, either accidental or suicidal, has become common due to easy availability and low cost of the pesticides. Organophosphate insecticides have been implicated in majority cases of human poisoning in Kenya [2,11]. Lang *et al*. have also revealed that organophosphates are the most commonly used suicidal poisons irrespective of age, sex and occupation of the victim [12]. Reports available from some Asian countries (Pakistan and Srilanka) and African countries (Uganda) describe organophosphate crop sprays and drugs as the commonly used

toxic substances in poisoning with mortality rates varying from 2.0% - 2.1% [13-15].

The present study showed that kerosene poisoning accounted for most (59.8%) of the poisoning cases that occurred in the 0-5 years age group. This is consistent with previous studies carried out in Kenya. Lang *et al.* reported that paraffin poisoning was the most common form of poisoning in Kenya, constituting more than 60% of all paediatric poisoning cases [12]. These findings were corroborated by Maitai *et al*. who reported similar findings [3].

The results showed that poisoning was most prevalent at ages of 21-30 years (38% of all cases) mostly with pesticides, followed by 0-5 years (24%), mostly with kerosene. Thapa *et al*. have reported similar findings in a study which indicated that poisoning was most common in the 21-30 years age group (40.5%). Similarly, the study revealed that the most common causes of poisoning in adults were organophosphorous compounds and in children was kerosene [16,17].

Suicide was the most common circumstance of poisoning, accounting for 43.7% of total poisoning admissions and 70.7% of all poisoning among those in the 21-30 years age bracket. This has also been shown elsewhere [6,14] especially in Canada whereby a study carried out in 1999-2000 recorded about 68% of all poisoning admissions as attributable to suicide or self-inflicted harm [6]. Other studies have revealed similar pattern [17]. The patients involved are young adults faced with new challenges in their relationships, finances and emotional status.

About 59% of all accidental cases of poisoning occurred in the 0-5 years age group with 68% of all cases of poisoning at this age group being accidental. Kerosene poisoning accounted for 59.8% of all poisoning cases within this age group. This is a common accident in Kenyan homesteads because it can be mistaken for water or another common household liquid. Studies carried out in Kilifi District Hospital, Kenya found that all cases of children admitted with paraffin poisoning were accidental [12].

Poisoning with unknown substances was more prevalent in the 21-30 years and 31-40 years age groups. These may have been suicidal cases that made use of unknown chemicals.

The oral route was the most commonly used route for administration of poisons (93.5%). Thapa *et al*. found that oral route accounted for 79.05% of the poisoning cases, of which 66.2% were intentional poisoning for suicidal attempts [17,18].

CONCLUSION

Acute poisoning bears a significant impact on morbidity and mortality. Awareness and education campaigns about the potential toxicity of commonly used drugs and household substances may help in reducing the burden of poisoning. Suicide among young adults is a common public health problem and pesticides are the main agents used. Consequently, strict rules should be instituted regarding sale of pesticides, which are currently easily accessible and affordable. Similarly there is an urgent need for strict implementation of the Pesticide Act, which regulates the import, manufacture, sale, transport, distribution and use of pesticides with a view to preventing risk to human beings. Further, parents should keep chemicals and medications out of reach of young children.

The changing trends of poisoning need to be studied for proper health care policy planning, so as to equip hospitals and other health care facilities with tools for proper diagnosis and effective management of poisoning.

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