

# Characteristics of acute poisoning at two referral hospitals in Francistown and Gaborone

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## Abstract

**Background:** The epidemiology of acute poisoning in Botswana is not well established due to the limited availability of published data. In an attempt to fill this gap, this study aimed to characterise acute poisoning cases admitted to two urban hospitals in Francistown and Gaborone, Botswana.

**Methods:** This study followed a descriptive methodology involving 116 patients with the primary diagnosis of acute poisoning admitted to two referral hospitals in Botswana from January to June 2005. Data were collected by means of a pre-tested data-collection form.

**Results:** Overall, 58 (50%) of the victims of acute poisoning were female, accidental poisoning occurring in 89 (76.9%) of the cases. Intentional poisoning was reported in 33.3% of the females versus 13.5% of the males. With regard to demographic distribution, the majority of the victims were in the age category of 13 to 19 (20.7% versus 5.2%) for the females and in the 30-year-old group for the males (24.1% versus 10.3%). Poisoning by household chemicals, particularly paraffin, affected mainly children under 12, while poisoning by pharmaceuticals involved mainly teenagers. With regard to outcomes, three of the female victims died, representing a case fatality rate of 2.6%. One death was due to paraffin poisoning and two to traditional medicine. Those who died were two children in the 0 to 12-year group and one adult in the age category of 20 to 30.

**Conclusion:** The acute poisoning involved a variety of toxic agents of which household chemicals and pharmaceuticals predominated. Differences based on age category, sex, the types of toxic agents involved and the outcomes of the poisoning incidents were noted. Future interventions should take these differences into account.

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## Introduction

Acute poisoning is a common reason for visits to emergency departments and for hospitalisation worldwide. It is estimated that poisoning events are responsible for more than one million illnesses annually.<sup>1</sup> Although hospital prevalence of acute poisoning in Southern Africa varies from 1 to 17%, the epidemiology of acute poisoning in Botswana is less established due to the lack of published data in internationally accessible databases.<sup>2-4</sup> It is known, however, that poisoning by various agents contributes to 7% of morbidity and ranks third among injuries leading to hospitalisation in Botswana.<sup>5</sup> Specific agents involved in poisoning incidents, however, are still less established. Similarly, little is known of how the sex and age of victims influence acute poisoning. In an attempt to fill this gap, this study aimed to characterise acute poisoning cases admitted to two urban hospitals in Botswana. The objectives of the study were to determine the common toxic agents involved in poisoning and to compare outcomes with regard to age and sex. Knowledge of the patterns of poisoning could be helpful in the design of interventions geared at the reduction of morbidity and mortality due to this scourge.

## Methods

This was a descriptive study based on a review of the hospital records of patients admitted during the first half of 2005 to two hospitals situated in the large urban centres of Francistown and Gaborone in Botswana. The two hospitals were chosen because they are referral centres that treat cases from district hospitals and health centres. A sufficient number of cases could be gathered for analysis during the short study period. The field workers initially identified patients diagnosed with poisoning from the ward registers. By means of a pre-tested data-collection form, they then collected data on age category, gender, diagnosis, the names of the toxic agents involved and the outcomes of the treatments (whether the patients survived or died as a result of the poisoning). Based on case histories, information was gathered on whether the events were accidental or intentional. A case was classified as accidental if it was recorded as such and if the clinical notes did not state that it was suicide or parasuicide. Data were captured in a spreadsheet and analysed with the Statistical Package for Social Sciences (SPSS) Version 13. Permission to access patient data was obtained from the institutional managers and ethical clearance for the study was obtained from the Ethics and Research Committee of the Faculty of Medicine, University of Limpopo.

## Results

Of the 116 patients admitted with a diagnosis of acute poisoning, the proportion of male to female was approximately equal (58 (50%). With regard to the circumstances of the poisonings, the majority of the cases were accidental. The toxic agents most involved in the poisonings were, in descending order, household chemicals (44.2%), pharmaceuticals (20.8%) and traditional medicines (6.8%). Food poisoning affected 8.5% of the people. The age of the victims ranged from 0.1 to 73 years. The acute poisonings affected 45.3% of the young children in the age group of 0 to 12 as compared to 12.8% of the teenagers (see Table I).

Deliberate poisoning was more common in the group aged 20 to 30 (51.7%), followed by the teenagers (46.7%), but was not reported in the children younger than 12. Household chemicals affected the younger children most, while pharmaceuticals affected more teenagers (20%) than adults. A quarter of the adults were affected by traditional

**Table I:** Frequencies of study variables (n = 116)

Variables	Frequency (%)
<b>Age category</b>	
• 0 to 12 years	53 (45.7)
• 13 to 19 years	15 (12.9)
• 20 to 30 years	28 (24.1)
• Over 30 years	20 (17.2)
<b>Sex</b>	
• Female	58 (50.0)
• Male	58 (50.0)
<b>Circumstances of poisoning</b>	
• Accidental	89 (76.9)
• Deliberate	27 (23.1)
<b>Outcome</b>	
• Survived	113 (97.4)
• Died	3 (2.6)
<b>Toxic agents involved</b>	
<b>Household chemicals 51 (43.9)</b>	
• Paraffin	16 (13.8)
• Unspecified chemicals	12 (10.3)
• Alcohol	12 (10.3)
• Carbon monoxide	6 (5.2)
• Potassium permanganate	4 (3.4)
• Potash	1 (0.9)
<b>Pharmaceuticals 26 (22.4)</b>	
• Unspecified medicine overdose	16 (13.8)
• Paracetamol	5 (4.3)
• Amitriptyline	1 (0.9)
• Chlorpromazine	1 (0.9)
• Diazepam	1 (0.9)
• Amoxicillin	1 (0.9)
• Ferrous sulphate	1 (0.9)
<b>Animal/insect bites 3 (2.6)</b>	
<b>Farm chemicals 5 (4.3)</b>	
• Organophosphates	4 (3.4)
• Insecticides	1 (0.9)
<b>Food poisoning 10 (8.6)</b>	
<b>Unspecified drugs of abuse 3 (2.6)</b>	
<b>Plants 10 (8.6)</b>	
<b>Traditional medicines 8 (6.9)</b>	

medicine but no such cases were reported in the teenagers. In the case of alcohol intoxication, 10 of the 12 (10.3%) cases involved the group over 20 years old; only two cases involved the teenagers. Food poisoning affected all the age groups (see Table II).

With regard to sex (Table III), the female victims in the age category of 13 to 19 were in the majority (20.7% versus 5.2%), whereas the males led in the over-30 group (24.1% versus 10.3%). Moreover, more of the females were victims of poisoning by pharmaceuticals (36.9% versus 8.5%), whereas more of the males were affected by household chemicals (45.8% versus 29.8%). In particular, of the 12 (10.3%) cases of alcohol intoxication, 10 were reported in the males. Similarly, six of the eight (6.8%) cases of poisoning by traditional medicine and all three of the cases of poisoning through drugs of abuse involved the male victims. In contrast, four of the five cases of paracetamol

**Table II:** Frequencies of study variables by age category (n = 116)

Variables	Age category (%)			
	0 to 12 (n = 53)	13 to 19 (n = 15)	20 to 30 (n = 28)	> 30 years (n = 20)
<b>Circumstances</b>				
Deliberate	0 (0.0)	7 (46.7)	15 (53.7)	5 (25.0)
Accidental	53 (100)	8 (53.3)	13 (46.5)	15 (75.0)
<b>Toxic agents</b>				
• Farm chemicals	1 (1.9)	1 (6.7)	3 (10.8)	0 (0.0)
• Pharmaceuticals	5 (9.4)	8 (53.5)	12 (43.0)	1 (5.0)
• Unspecified drugs of abuse	0 (0.0)	1 (6.8)	1 (3.4)	1 (5.0)
• Household chemicals	34 (64.2)	5 (33.3)	7 (25.1)	5 (25.0)
<b>Animal/insect bites</b>	0 (0.0)	0 (0.0)	3 (10.8)	0 (0.0)
<b>Food poisoning</b>	4 (7.5)	1 (6.8)	3 (10.8)	2 (10.0)
<b>Plants</b>	9 (17.0)	0 (0.0)	0 (0.0)	1 (5.0)
<b>Traditional medicines</b>	2 (3.8)	0 (0.0)	1 (3.4)	5 (25.0)

**Table III:** Frequencies of study variables by sex (n = 116)

Variables	Sex (%)	
	Female	Male
<b>Age category</b>		
0 to 12 years	26 (44.8)	27 (46.6)
13 to 19 years	12 (20.7)	3 (5.2)
20 to 30 years	14 (24.1)	14 (25.9)
Over 30 years	6 (10.3)	14 (24.1)
<b>Circumstances of poisoning</b>		
Accidental	38 (66.7)	51 (86.4)
Deliberate	19 (33.3)	8 (13.5)
<b>Outcome of poisoning</b>		
Survived	54 (97.7)	59 (100.0)
Died	3 (5.3)	0 (0.0)
<b>Toxic agents involved</b>		
Household chemicals	20 (35.0)	31 (52.9)
Pharmaceuticals	19 (33.3)	7 (12.3)
Animal/insect bites	0 (0.0)	3 (5.1)
Farm chemicals	2 (3.5)	3 (5.1)
Food poisoning	6 (10.5)	4 (6.8)
Unspecified drugs of abuse	2 (3.5)	1 (1.7)
Plants	4 (7.0)	6 (10.2)
Traditional medicines	2 (3.5)	6 (10.2)

poisoning, four of the six cases of carbon-monoxide poisoning and fourteen of the sixteen cases of unspecified medicine-overdose poisoning affected the female victims. Intentional poisoning was higher in the females than in the males (33.3% versus 13.5%).

With regard to outcome, three of the female victims died, representing a case fatality rate of 2.6%. One of the deaths was due to paraffin poisoning and two to traditional medicine. Those who died were two children in the 0 to 12-year group and one adult in the age category of 20 to 30.

## Discussion

This study sought to characterise acute poisoning at the two hospitals in Botswana. Overall, acute poisoning affected both males and females in similar proportions but deliberate poisoning was more prevalent in females than males. This finding is consistent with reports by other investigators.<sup>6</sup> In this study, the number of suicides peaked in

the young-adult group before decreasing in the group of those over 30. Although the reasons for suicide could not be explored in this retrospective study, reports by other investigators suggest that negative life events, psychiatric illnesses and socioeconomic problems, such as unemployment, constitute the reasons why people resort to suicide in dealing with life's difficulties.<sup>7</sup>

With regard to demographic distribution, the majority of the cases of poisoning were reported in children under 12, but female victims were the majority in the age category of 13 to 19, whereas males led in the category of those over 30. This distribution corresponds with the age groups in which suicides peak for both females and males.<sup>8</sup> Substance abuse could have some influence in this distribution, since the majority of cases of alcohol intoxication and all the cases of poisoning through drugs of abuse were reported in males. In contrast, more females were victims of poisoning by pharmaceuticals such as paracetamol and unspecified medicine overdoses. This contrast could be explained by the differential access between men and women to agents involved in these poisoning incidents. These findings do not, however, corroborate other studies where female teenagers constituted the majority of acute poisoning cases.<sup>9-10</sup> Furthermore, paraffin was involved most in poisoning in younger children. This finding has previously been reported in other countries.<sup>11-12</sup> Since the study was conducted in urban areas, this may explain why few cases of poisoning by farm chemicals and more by pharmaceuticals were reported.

The agents responsible for fatalities in this study were traditional medicine and paraffin. This highlights the risk posed by these two groups of products, which are readily available to communities. Although it is still unclear which factors accounted for the fatalities, it is known that, in the case of acute poisoning, factors such as the intrinsic toxicity of the poisoning agent and the dose consumed play an important role, particularly in traditional medicine.<sup>13-14</sup> The case fatality rate of 2.6% reported in this study is slightly higher than mortality rates reported elsewhere.<sup>2,13-15</sup>

The above findings have several implications. Firstly, the findings highlight the need for the public to be educated on the topic of acute poisoning. Such public education should focus on women due to their status as both victims and caregivers of children. Among the key messages for public education, the dangers associated with the misuse of both traditional and modern medicines and the inappropriate storage of household chemicals should be emphasised. There is also a need for the public, particularly men, to be educated on sensible alcohol consumption for the prevention of related intoxication.<sup>16</sup> Secondly, a regulatory approach should include measures aimed at the strengthening of the ethical responsibilities of farmers, storekeepers, pharmacists and other health care workers on the need to advise their workers, clients and patients on the safe use and storage of chemicals, including pesticides, hydrocarbons and pharmaceuticals, sold to them. Finally, it is worth noting that the two facilities where the study was conducted are not representative of all hospitals in Botswana and that the findings of this study can therefore not be generalised.

## Conclusion

The acute poisoning involved a variety of toxic agents of which household chemicals and pharmaceuticals predominated. There were differences based on age category, sex, the types of toxic agents involved and the outcomes of the poisoning incidents. Future interventions should take these differences into account.

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