

# The Epidemiology of Poisoning in Kenya — A Review

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The use of poisons by humans predates the recorded history but the situation changed dramatically during and soon after second world war when very toxic chemicals were synthesized. Concern regarding the deleterious effect of synthetic chemicals was raised in 1950s prompting the establishment of poison control centers in many industrialized countries. In this paper, the author examines the epidemiology of poisoning in Kenya and shows that even though there is paucity of statistical data on cases of poisoning it is possible to discern a pattern of poisoning by extracting information from various sources.

## INTRODUCTION

The use of poisons by humans predates recorded history and was closely associated with magicians and practitioners of occult religions. Poisons were used for trial by ordeal on the mistaken belief that they would kill the guilty while sparing the innocent. Most of the early poisons were of natural origin. The Greek Philosopher, Socrates was condemned to death by his countrymen and forced to drink "oil of hemlock" which contains the toxic alkaloid, coniine.

The introduction of a large number of synthetic poisonous chemicals during and soon after second world war created problems with respect to the health of the users and the general public at large. Organophosphates developed during second world war were so toxic that neither side could bring itself to use them before the end of the war.

Modern interest in poisoning was brought into sharp focus in the 1950s by pediatricians in America who highlighted household agents as important source of poisoning in children. In 1958, the first meeting of American Association of Poison Control Centers (PCC) was held in Chicago. PCC have continued to be the most important source of information on human poisoning to professionals and the general public in industrialized countries.

Acute cases of poisoning attract maximum attention because of the dramatic onset of symptoms and the impending fear of sudden death. In contrast, chronic cases of poisoning are insidious and attract little attention. They are often confused with disease conditions. For example, paraquat poisoning has been confused with diphtheria.

The majority cases of poisoning are caused by pesticides. These pesticides are classified into insecticides, herbicides, fungicides, nematicides and rodenticides. The World Health Organization Expert Committee on Insecticides, estimate that over 2 million people are poisoned with pesticides globally every year and of these, 40,000 die as a result of such poisoning[1]. Attempt by WHO Committee to classify

chemicals into extremely hazardous (e.g. parathion) and slightly hazardous (e.g. malathion) serves limited purpose because in the final analysis it is the amount ingested that matters. Suicidal patients take massive doses; approximately 10-20 times the lethal dose.

## POISONING IN KENYA

As in any other country, poisoning in Kenya falls under the broad categories of accidental and deliberate poisoning. The latter include homicide and self poisoning. Statistics on cases of poisoning are scanty and generally unreliable. Only the most serious acute cases of poisoning, perhaps less than 5%, ever reach the hospitals. Of the few that reach hospitals, several are misdiagnosed and it is only in retrospect (after death or recovery) that poisoning is suspected. The majority of cases of accidental poisoning involve minor sub-acute symptoms (nausea, vomiting etc.) and resolve readily at home without any intervention or at best ineffective treatment. It is estimated that in Kenya approximately 700 pesticide related deaths occur every year [2]. Farm workers are particularly vulnerable. Drugs, household agents and poisonous plants are also important cause of death in Kenya.

## DIAGNOSIS OF POISONING

Diagnosis of poisoning in Kenyan hospitals is usually tentative pending confirmation by chemical analysis. Usually, clinicians use symptoms and case history to arrive at the tentative diagnosis. Unfortunately, rarely do they request for chemical analysis to identify the poison and hence confirm the tentative diagnosis. Experienced clinicians know that by the time the results of analysis are received, the patient is dead, has recovered or they make little difference to the overall management of the poisoned patient. In case of self poisoning, the container will be found in the vicinity together with an explanatory note. Similarly, children make no attempt to hide containers from which they get the poison. In a few cases, the poison can be identified from physical and chemical characteristics such as smell (kerosene, alcohol).

## SOURCE OF INFORMATION ON POISONING

No poison control center worth talking about exist in Kenya. Similarly, many Kenyan hospitals have no proper documentation of cases of poisoning and even where documentation exist, retrieving the information is difficult. However, it is possible to get an overview of the relative importance of various chemical agents involved in poisoning from various sources and these are considered below:

### Hospital Records, Interviews with Clinicians, Nurses etc.

Useful information on poisoning pattern can be obtained from private and public hospitals even though it is difficult to retrieve the information from records. However, talking to clinicians and nurses, especially those working in casualty department, one gets a fairly good impression of the relative importance of various poisoning agents involved. Kerosene, chloroquine and organophosphates were consistently identified as major poisoning agents encountered in hospitals. Poisoning with psychotropic drugs, particularly in self-poisoning, was said to be on the increase. Methyl alcohol poisoning is now common in Kenya. Surprisingly, no authoritative publication on the subject is available.

### Publications as a Source of Information on Poisoning

There are a few publications on the pattern of poisoning in Kenya. Kahuho [3] collected data on 72 patients treated for drug and chemical poisoning in the Intensive Care Unit (ICU) Kenyatta National Hospital between August 1972 and April 1978. He concluded that organophosphates, chloroquine and CNS depressants accounted for many deaths. Muu [4] collected and analysed data on 59 poisoned children in Kenyatta National Hospital in 1985 and concluded that kerosene, organophosphates and CNS depressants were common cause of poisoning in children. More recently Maitai *et al* collected data from 19 Provincial and District Hospitals and published their findings in an earlier issue of this journal [5]. Limited information on poisoning is also to be found scattered in other publications such as IDRC Reports [2]. Meme *et al* has published two articles on mercury poisoning in Kenya [6, 7].

### Academic Publications - Thesis, Research Project Reports etc.

Several postgraduate students have undertaken research in toxicology. Some of this work has been published in scientific journals but in other cases the thesis are deposited in University libraries and no attempt has been made to disseminate the findings. Over the last 20 years, the author of this review has supervised over 10 postgraduates (MSc., Ph.D.) who did research in the area of organochlorine pesticide residues. Some of this work has been published in international journals [8, 9, 10].

The overall picture shows that the Kenyan environment is polluted with organochlorine pesticide residues.

## Forensic Toxicology Cases

Government analysts handle forensic cases on request from police and pathologists. They also accept few cases from public and private hospitals. They particularly deal with fatal poisoning cases where foul play is suspected. Data from the Government Chemists Department shows that alcohol, chloroquine, organophosphates and organochlorine are important agents in poisoning. The miscellaneous group include carbon monoxide, methyl alcohol, kerosene, poisonous plants and drugs [11].

Data from the Government Chemists show that there are several cases where the suspected poison (based on case history, clinical symptoms or post-mortem findings) was never confirmed. There are several possible explanations. Firstly, the allegation or claim of poisoning may have been based on flimsy ground. Secondly, some poisons are difficult to detect with routine chemical screening especially if the patient dies after prolonged hospitalization. Examples of such poisons include carbon monoxide, cyanide, mercury, thallium, paraquat and plant poisons. Thirdly, cases of food poisoning (botulin toxins etc) can not be detected during routine chemical screening.

## Geographical Variation in the Pattern of Poisoning

It is important to emphasize that the epidemiology of poisoning vary considerably from one country to another. Even within the same country the pattern may vary depending on the activity of the community. Thus in agricultural regions poisoning with pesticides, particularly acaricides feature prominently.

Poisoning with chloroquine, organophosphates and kerosene common in Kenya are relatively unimportant in America, Britain and European countries. In contrast, carbon monoxide gas and opiates are important causes of fatal poisoning in many developed countries. For example, in 1986, out of 9976 deaths due to poisoning in America, 3664 (35%) were due to carbon monoxide [12]. Opiates are common causes of poisoning among drug addicts in America and a person found in a coma of unknown origin is normally given nalaxone injection almost routinely.

There are some common characteristics regarding the pattern of poisoning worldwide. For example, the most vulnerable age groups tend to be children aged 1 to 5 years and the elderly. Similarly, cases of homicides are generally few compared to accidental poisoning and self poisoning. In 1986, out of 9976 deaths attributed to poisoning in America, only 30 (0.3%) were confirmed as homicide. In Kenya, cases of homicides are few despite many allegations particularly among close family members.

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