

A Seven - Year Review of Accidental Kerosene Poisoning in Children at Aminu Kano Teaching Hospital, Kano

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Abstract

Background: Accidental ingestion of kerosene is a potential source of morbidity and mortality in children. The objectives of the study are to determine to magnitude of the problem and proffer feasible solutions to reduce the frequency of occurrence.

Methodology: The medical records of all cases of kerosene poisoning admitted into Paediatric Medical Ward and Emergency Paediatric Unit were identified and relevant data extracted and analysed.

Results: Kerosene poisoning constituted 55 (1.2%) of cases of all paediatric admissions within the period (Jan 1999 Dec 2005). The study showed that children 4months to 8years were affected with peak age of 18 months. Thirty-four (61.8%) of the cases were aged below 2 years which conforms to findings in earlier studies in Nigeria. Main clinical feature was cough with difficulty in breathing in 52 (94.5%) of cases. Others features noted were central nervous system involvement (14.5%), vomiting (20%), and fever 16 (29.1%). There were 3 deaths giving the mortality of 5.5%.

Conclusion: The study has revealed that kerosene poisoning is a significant cause of morbidity and mortality. Government policies that will enhance the standard of living of people and education of parents/care givers are the identified imperatives for reduction of the problem.

Key words: Accidental, Kerosene, Poisoning, Review.

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Introduction

Kerosene is a low viscosity aliphatic hydrocarbon which is poorly absorbed from the gastrointestinal tract¹. However, the major hazard associated with kerosene ingestion is aspiration into the respiratory tract. Kerosene is directly irritant to the airways and produces bronchiolar edema and spasm. Kerosene tends to spread widely over the

lining of small airways and alveoli and hence disrupts cell membrane integrity culminating in inflammatory response characterised by hyperaemia, vascular thrombosis, haemorrhage and edema. Additionally, the alveolar surfactant layer is dissolved with consequent alveolar collapse and atelectasis. The resultant hypoventilation with hypercobia produces a mixture of respiratory and metabolic acidosis. Secondary bacterial infections may supervene. Ingestion of kerosene produces clinical manifestations varying from no apparent effect to death². Kerosene ingestion has been established to be a significant cause of childhood morbidity and mortality³⁻⁸. Children who are in 1-3year age- group are mostly affected^{4,5}. The common symptoms of kerosene poisoning are cough, dyspnea, fever, diarrhea, vomiting, central nervous system depression which can range from drowsiness to coma and may be associated with seizure disorder. In 1962, a subcommittee of the American Academy of paediatrics reported the annual incidence of kerosene ingestion in the United States as 28, 000 cases with 83 deaths.⁹ Although there are no National figures for Nigeria, a few studies have been conducted in various parts of the country.^{5, 8} There has been no detailed publication on kerosene poisoning among children in Kano. This retrospective review aims to document the pattern of kerosene poisoning in Kano, and to compare the result with findings else where.

Materials and Methods

The medical records of children admitted to the Emergency Paediatric Unit (EPU) and Paediatric Medical Ward of Aminu Kano Teaching Hospital, Kano with kerosene poisoning during a 7-year period (January 1999 December 2005) were reviewed. The data extracted from the records included the patient's age, sex, date of admission, clinical features, duration of stay in hospital and outcome. The extracted data were entered in designated forms, checked and corrected for errors; they were coded, entered into personal computer and analysed using SPSS statistical package. Percentages and ratios were used to determine relationships.

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Results

During the 7-year period under review there were 4490 paediatric admissions of which 55(1.2%) were cases of kerosene poisoning. The yearly admissions due to kerosene poisoning and percentage of total paediatric admissions are shown in Table I

Age and Sex Distribution

The children were aged 4 months to 8 years with a mean age of 26.6 months and a peak age of 18months. Thirty-four (61.8%) of the 55 cases were below 2 years of age (Table II). There were 35 males and 20 females, a male to female ratio of 1.75:1. Only 5 children were above 5 years.

Clinical Features

The commonest presenting features were cough and difficulty in breathing occurring in 52 (94.5%), followed by vomiting in 20 (36.4%); fever in 16 (29.1%), central nervous system depression in 8 (14.5%) and diarrhea in 1 (1.8%). CNS involvement was mostly manifested as coma, drowsiness and restlessness. Those who presented with respiratory difficulties had pneumonia which was confirmed radiologically.

Morbidity and Mortality

Eleven (20%) of patients were discharged within 24 hrs of admission while 6 (10.9%) patients stayed beyond 4 days. The mean duration of hospitalization was 47.4 hours (range 2 hours - 11days). There were 3 deaths, an overall mortality of 5.5%.

Table I: Yearly admissions of 55 cases of kerosene poisoning

Year	No. of cases	Total Paediatric Admissions	% of Total
1999	4	377	1.06
2000	1	520	0.19
2001	17	615	2.76
2002	1	557	0.18
2003	10	769	1.30
2004	11	795	1.38
2005	11	857	1.28
Total	55	4490	1.22

Table II: Age distribution in 55 cases of kerosene poisoning

Age (Yrs)	No. of cases	% Of Total
< 1year	5	9.09
1	29	52.73
2	11	20.00
3	4	7.27
4	1	1.82
5	1	1.82
> 5	4	7.27
Total	55	100.00

Discussion

The present retrospective study shows that accidental poisoning with kerosene is an important health problem constituting 1.2% of the total number of admissions to the paediatric wards over a 7 year period. This value is higher than those reported by Izuora and Adebowale in Saudi Arabia⁴ (1%), Fagbule and Ojuawo in Ilorin⁸ (0.05%) and Ganga et al in India¹⁰ (0.09%). The relative higher percentage in the current study may be explained by several reasons which may include increasing human populations, relative poverty warranting that households still use kerosene instead of gas for heating and lighting, increasing participation of mothers in paid jobs and trading and so poor supervision of young ones and social tensions leading to less care in handling potentially poisonous substances. The yearly variations in the occurrences of kerosene poisoning in the study reflected the trends in the society within these periods. The first four years reflected the relative plenty and scarcity alternately which concided with attempts by the government to liberalise the marketing of petroleum products. In consonance with the fluctuations, the availability of kerosene in the homes varied paripasu. In the last 3 years (2002 - 2005) availability of kerosene was fairly constant and that probably reflected in the similar yearly percentages in incidences of kerosene poisoning. The peak age incidence at 18 months is comparable to the findings at Ilorin^{5,8} and Ibadan⁷. Children at this age are highly mobile, curious and would put to mouth any familiar containers and their contents. The male to female ratio of 1.75:1 is comparable to the findings of 1.7:1 at Ilorin by Fagbule and Joiner⁵. The preponderance of male to female patients is in line with most earlier studies in Nigeria^{5,8} and elsewhere^{4,10-12}. This finding may be a reflection of the more adventurous nature of boys; a view shared by Onedeko at Ibadan⁷. The finding of only 5 cases of kerosene poisoning after 5 years is comparable to the Ilorin series⁵ where only 4 cases were found. Our study showed that a 4 month old child was involved. This was a case where the mother had stored kerosene in paracetamol syrup bottle but forgot that she had done so and gave it to the child when he developed fever.

Pulmonary complications in 94.5% is comparable to the 89.9% in Ilorin⁵ but higher than the 73.6% reported in Zaria⁶. The respiratory signs and symptoms most often result from the attempt by parents/caregivers to induce emesis which would lead to aspiration pneumonitis. Moreover, some people injudiciously administer milk

and palm oil as antidotes to these children which increases the risk of pneumonitis as observed in earlier studies in Nigeria^{5,6,8}. In some of our patients, such practices were reported. Neurologic complications in 14.5% is lower than the 26.5% reported from Ilorin⁵. However, in Zaria⁶ and in a series reported earlier in Ilorin by Fagbule and Ojuawo⁸, no case of central nervous system involvement was observed. More patients (20%) were discharged within 24 hours compared to the study in Ilorin⁵ where only 11.9% of the patients were discharged within the same time. Probably less severe respiratory symptoms and fewer patients in our series with neurologic involvement may explain the disparity. Long hospital stay in some of the patients implied economic losses on the part of the parents as well as disruptions in family dynamics. The mortality of 5.5% is comparable to that of 4.6% reported from India¹⁰ but much higher than the figures from Zaria⁶ (1.6%), Ilorin⁵ (0.9%). The higher mortality documented may be explained by the severe respiratory symptoms and the marked neurologic involvement in the 3 cases that died. Probably absence of intensive care facilities which these cases required contributed to the higher mortality in our series.

The control and prevention of kerosene poisoning requires a comprehensive approach which should include health education, measures to make the home environment child friendly, enactment and enforcement of relevant regulations as well as provision of intensive care facilities in all secondary and tertiary health facilities. The public should be made aware of the dangers inherent in kerosene poisoning. In particular, during the dry months, patients/caregivers should be made to give the children water at chosen intervals so that the toddlers don't seek for water in just any container within their reach thereby poisoning themselves unknowingly. Considering the harsh economic situation in Nigeria and the frequent scarcity of cooking gas in Nigeria, kerosene will continue to be used in the homes. It is the responsibility of the government to initiate plans on enhancing the living standards so that the need for kerosene in the homes will be reduced.

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