Original Research

# Paraffin poisoning in children: What can we do differently?

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**Keywords:** paraffin poisoning, children, antibiotic overuse, South Africa

## Abstract

**Background:** The purpose of this study was to describe the occurrence, health cost and management of paraffin poisoning in a rural South African hospital.

**Methods:** A retrospective study was undertaken of 145 children admitted with a diagnosis of paraffin poisoning at Philadelphia Hospital, Mpumalanga from January 2000 to June 2001. A pre-tested form was used to collect data from the admission files. Where applicable, the Chi-square test or t-test was used to determine statistical significance.

**Results:** Children younger than five years of age were affected significantly more than those older than five years of age (91% vs. 9%, p<0.001), and boys were affected more than girls (58% vs. 42%, p=0.034). The average length of stay and cost of treatment were 2.5±2 days and R617.24 respectively. Prophylactic antibiotics were prescribed in 86% of cases (125/145) and the average number of medications prescribed per child was 3.5±1.8.

**Conclusions:** Although no mortality was reported, paraffin poisoning contributed substantially to the morbidity of, health expenditure for and antibiotic overuse in these children. Provision of child-resistant paraffin container caps, retraining of doctors on appropriate antibiotic use and community education are necessary and crucial in reducing the occurrence of paraffin poisoning in children.

***(SA Fam Pract 2005;47(2): 54-56)***

## Introduction

Paediatric poisoning continues to be a cause for the admission of children to hospital throughout the world, although it is associated with low morbidity and mortality.[1,2,3,4,5,6] In South Africa, Reed and Conradie reported that children younger than five years of age admitted with the diagnosis of paraffin poisoning represented 9.1% of total ward admissions for this age group at Shongwe Hospital.[7]

The aim of this study was to describe the occurrence, cost and management of paraffin poisoning in a rural South African hospital.

## Methods

A retrospective study was undertaken of all children admitted at Philadelphia Hospital, Mpumalanga with the diagnosis of paraffin poisoning from January 2000 to June 2001. Data were collected from the 145 medical records of children under the age of 12 years using a pre-tested data collection form. The data collected included demographic characteristics, length of stay in the hospital, medicines prescribed and treatment outcomes. The cost per patient was calculated as the product of the length of stay and the daily fee for the paediatric ward.[8] The three drug use indicators were determined using the average number of drugs prescribed per patient, the percentage of patients for whom an antibiotic was prescribed, and the percentage of patients who were prescribed an injection.[9] Where applicable, the Chi-square test or t-test was used to determine statistical significance.[10]

## Results

Children younger than five years of age were affected significantly more than those older than five years of age (91% vs. 9%; p<0.001), and boys were affected more than girls (58% vs. 42%; p=0.034) (See Figure 1). The male to female ratio was 1.45:1. The average length of stay was 2.5±2 days and the total length of stay was 366 days. The average treatment cost per patient was R617.24 and the approximate total cost was R89 500.00. The average number of medicines prescribed per child was 3.5±1.8 and the percentage of patients prescribed an antibiotic or an injection were 86% and 17% respectively. Table I shows

Figure 1: Paraffin poisoning in children by age Group and gender (n=145)

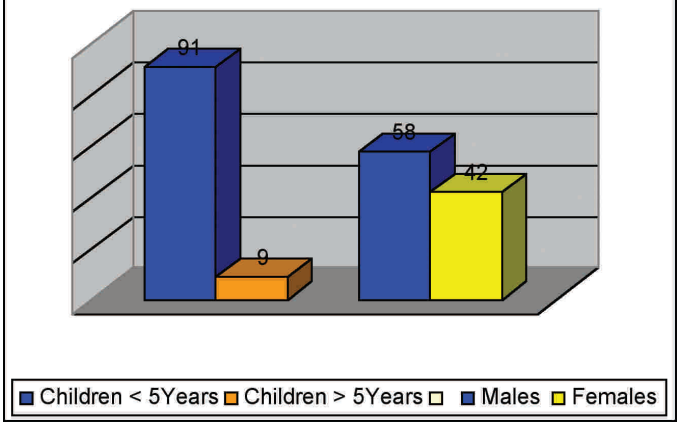


**Table I:** Antibiotics prescribed (n = 145)

| | Frequency | Percentage (%) |
|---|---|---|
| Amoxicilin syrup | 110 | 76 |
| Cefuroxime injection | 15 | 10 |
| Cloxacillin injection | 10 | 7 |
| Cotrimoxazole suspension | 3 | 2 |
| Erythromycin syrup | 12 | 8 |

the frequency of antibiotic prescriptions in these patients, with amoxicillin being the most prescribed antibiotic. The case fatality rate was zero.

## Discussion

The findings of this study show that paraffin poisoning in children occurs more frequently in those younger than five years, with a male to female ratio of occurrence of 1.45:1. This age and gender distribution pattern is consistent with previous studies by other investigators.[11,12,13,14,15,16] Possible reasons for these observations include the exploratory nature of young children and the improper storage of paraffin in the household. Paraffin remains the leading toxic agent in paediatric poisoning because it is widely available and used by more than half of the South African population as a source of energy for cooking, lighting and heating.[17,18] The mean length of stay was 2.5 days and is similar to that found in the study by Ho and colleagues in Singapore.[19] This suggests that these poisonings were of such a low severity that they could have been managed as ambulatory cases and points to the need for clear clinical criteria for the admission of these children.[20,21]

Regarding the drug use indicators, the average number of drugs prescribed was 3.5±1.8, which was higher than but not statistically significant when compared with the provincial average of 2.5 drugs, suggesting that, in general, there was no polypharmacy in the management of paraffin poisoning in this study.[22] The number of children who had antibiotics prescribed to them, namely 125/145 (86%), was disturbing . This percentage is higher than the average of 40.5% antibiotic use reported during a provincial survey, suggesting that antibiotics, especially amoxicillin, were overused in these children. The main reason for the use of antibiotics in these patients was to prevent secondary respiratory infections.[23] Simmank and colleagues reported that secondary infections due to paraffin ingestion are uncommon.[24] This is supported by Reed and Conradie, who recommend that antibiotics should not be routinely used in the management of paraffin poisoning.[7]

The treatment of paraffin poisoning in children by using antibiotics in 86% of the cases reported in these studies, including the provincial survey, is a cause for concern because of possible increasing antibiotic resistance.[25,26] The percentage of children prescribed an injection was 17%. This percentage is lower than the 21.1% injection use reported during the same provincial survey, indicating that injections were not overused in this study. No deaths were reported in this study. A substantial proportion of paediatric poisoning does not result in clinical toxicity because paediatric poisoning is primarily accidental. In the majority of cases, therefore, the doses of toxic agents ingested are not high enough to lead to fatalities.[27]

## Conclusions

Paraffin poisoning at Philadelphia Hospital affected mainly boys, contributed substantially to the morbidity of children below the age of five years and to health expenditure, and resulted in the overuse of antibiotics, especially amoxicillin. The provision of child-resistant paraffin container caps, the retraining of doctors in appropriate and rational antibiotic use, and community education are necessary to reduce the occurrence of paraffin poisoning in children.

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