

# Kerosene Poisoning in Childhood: A 3-Year Retrospective Study at a Tertiary Referral Hospital

Kumaravel K S<sup>1</sup>, Rameshbabu B<sup>2</sup>

## ABSTRACT

**Introduction:** Kerosene Poisoning is an important and preventable cause of morbidity and mortality in the developing world. Kerosene aspiration may be associated with pulmonary complications and sometimes death. Objectives: To study the clinical profile of children with kerosene poisoning.

**Material and Methods:** This is a 3 year retrospective study of children admitted with kerosene poisoning in Govt. Dharmapuri Medical College Hospital, Dharmapuri between the years 2013 to 2015. Demographic and clinical data were recorded from the case records.

**Results:** 150 children were admitted with kerosene poisoning. Male preponderance (64%) was noted. There was seasonal preponderance in the months of April to June. There was also an urban preponderance. The peak age group was from 1 to 3 years. Cough (85%), fever (65%) and vomiting (69%) were the dominant symptoms. Radiologically Right lower lobe infiltration was seen in 30% of children and bilateral lower lobe infiltration was seen in 15% of children. There was one death due to encephalopathy and respiratory failure in the study period.

**Conclusion:** Kerosene poisoning happens largely due to ignorance of parents. Further research is needed in Kerosene encephalopathy to ascertain whether it is primarily due to direct toxic effect of the hydrocarbon or secondarily due to hypoxia of pneumonitis. Kerosene should be dispensed in child proof bottles with pictorial warnings to deter children.

**Keywords:** Kerosene, Aspiration, Children, Vomiting, Pneumonitis

## INTRODUCTION

Kerosene is a hydrocarbon which still remains as a major fuel used for cooking in rural India. The huge subsidy the Government provides makes it an economical alternative to LPG. Kerosene is usually stored in any household container and is easily accessible to children. Kerosene Poisoning is an important and preventable cause of morbidity and mortality in the developing world.<sup>1,2</sup> Kerosene has been identified as the most common cause of accidental poisoning in various studies around the world.<sup>1-6</sup> Ingestion of large quantity of kerosene is rare because of its foul smell and taste. Aspiration of kerosene usually occurs during swallowing and even 1ml of kerosene aspiration may be associated with pulmonary complications and sometimes death.<sup>7</sup> Low viscosity of kerosene enhances penetration into distal alveoli. Low surface tension facilitates spread over a large area of lung tissue. Experimental toxicological studies have shown that aspirated, and not the ingested, kerosene affects the respiratory system. Signs and symptoms of respiratory involvement appear within 30 minutes after aspiration and progress during the first 1-2 days and then subside in the following one to two weeks.<sup>8</sup> The complications of kerosene poisoning include hypoxia, pneumonitis, bacterial pneumonia, pneumatocele, pleural effusion, pneumothorax, subcutaneous emphysema and empyema.<sup>8-10</sup> The usual gastro-

intestinal symptoms of kerosene poisoning are abdominal pain, vomiting and diarrhoea. Its Central Nervous System manifestations include drowsiness and convulsions. The aim of the study is to analyze the clinical profile of children admitted with kerosene poisoning in the Govt Dharmapuri Medical College Hospital, Dharmapuri, Tamilnadu, India.

## MATERIAL AND METHODS

This was a retrospective study. All the 150 children with Kerosene poisoning admitted in Govt Dharmapuri Medical College Hospital, Dharmapuri in Tamilnadu, India from January 2013 to December 2015 formed the study group. From the case records data regarding demographic, clinical features and radiological findings of children with kerosene ingestion were collected.

## STATISTICAL ANALYSIS

All the signs and symptoms, complications and outcome were tabulated and descriptive analysis was done.

## RESULTS

During the study period there were 150 children admitted with kerosene poisoning. All the 150 children were hospitalized in Pediatric Intensive Care Unit with duration of hospitalization ranging from 2-7 days. A male preponderance was observed with 64% of admitted children being males. With regard to age group, 1 to 3 years age group was most affected with about 90% affected children in the study group. About 68% of children hailed from urban area in the study group. The peak incidence of kerosene poisoning was in the months of April to June. In the symptom analysis of kerosene poisoning, the respiratory symptoms dominated the clinical picture. Cough, fever, vomiting and dyspnea were the most common symptoms and signs observed. Fever developed in 65% of patients, the temperature ranging between 38-41°C, with duration from 1-5 days. About 4% of the children had drowsiness and one child had encephalopathy and convulsions. Abdominal pain was reported by 4% of affected children. During the study period one death was observed and it was due to encephalopathy and respiratory failure. In the analysis of x-rays of children affected with kerosene poisoning, about 30% showed right lower lobe infiltration and about 15% showed bilateral lower lobe infiltration. One child had pneumothorax and was managed with

<sup>1</sup>Professor, <sup>2</sup>Associate Professor, Department of Pediatrics, Government Dharmapuri Medical College, Dharmapuri, Tamilnadu, India

**Corresponding author:** Dr. K.S. Kumaravel, 191A, Shankar Nagar, Salem, Tamilnadu, Pin: 636007, India

**How to cite this article:** Kumaravel K S, Rameshbabu B. Kerosene poisoning in childhood: a 3-year retrospective study at a tertiary referral hospital. International Journal of Contemporary Medical Research 2016;3(6):1832-1834.

Characters		No of patients	Percentage
	2013	47	
	2014	51	
	2015	52	
	Total	150	
Sex	Male	96	64%
	Female	54	36%
Age	<1 Year	1	1%
	1-3 Years	136	90%
	>3 Years	13	9%
Residence	Urban	102	68%
	Rural	48	32%
Season	Jan-mar	41	27%
	Apr-jun	46	31%
	Jul-sep	33	22%
	Oct-dec	30	20%

**Table-1:** Demographic characteristics of children admitted with kerosene poisoning.

Signs and symptoms	No of children	Percentage
Cough	128	85
Fever	98	65
Vomiting	103	69
Dyspnea	58	39
Cyanosis	26	17
Grunting	28	19
Drowsiness	12	8
Convulsions	2	1
Abdominal pain	6	4

**Table-2:** Distribution of symptoms and signs

Radiological finding	No of patients	Percentage
Right lower lobe infiltration	45	30
Bilateral lower lobe infiltration	23	15
Bilateral peri hilar infiltration	19	13
Normal	32	21
Other lobar infiltration	30	20
Pneumothorax	1	1

**Table-3:** Chest radiographic findings

Intercostal Drainage.

## DISCUSSION

Kerosene poisoning remains as a serious cause of morbidity and occasional mortality in rural India. The peak age group affected was 1 to 3 years as in study by Rashid et al and Anwar et al.<sup>7,11</sup> This age corresponds to the Oral stage of Psychosexual development of Freud where children put objects into their mouth as a reflex. The present study found an urban dominance in contrast to study by Anwar S and Mahdi AH et al.<sup>7,12</sup> Similar to studies by L. Nouri and K. Al-Rahim, this study also showed a seasonal preponderance in the months of April to June.<sup>13</sup> Cough was present in 128 patients (85%), whereas it was found in (83.5%) in Nagi study, (96%) in Mahjoob Al-Naddawi study and (67%) in Shotar study.<sup>14-16</sup> Fever was present in 98 patients (65%), which was (73.8%) in Nagi study and (94%) in Mahjoob Al-Naddawi study.<sup>14,16</sup> Vomiting after kerosene consumption was seen in 103 patients (69%) of this study. Nagi reported vomiting in (60.6%) and Mahjoob Al-Naddawi

reported vomiting in 90% of cases.<sup>14,16</sup> In the present study there was no instance of diarrhoea. This is in contrast to other studies which reported diarrhoea in about 4% of cases.<sup>14,16</sup> Majeed et al reported close relationship between the pulmonary involvement and neurological complications.<sup>17</sup> In the present study 12 children manifested drowsiness and 2 children had convulsions. It can be postulated that the encephalopathy is a result of direct toxic effect of hydrocarbon on the neural tissues rather than encephalopathy developing secondarily after hypoxia. Further research is needed to determine this.

## CONCLUSION

Toddlers are more vulnerable to kerosene poisoning mainly because of ignorance on the part of parents to store kerosene properly. The respiratory system is the target organ to be damaged in kerosene poisoning. CNS complications though rare, do occur. Though mortality is rare, we report a single case of mortality due to kerosene poisoning. Further research is needed in cases of encephalopathy that occurs in kerosene poisoning to ascertain whether it is primarily due to direct toxic effect of the hydrocarbon or secondarily due to hypoxia of pneumonitis. Looking at the annual disease burden of kerosene poisoning in India, the Government needs to take concrete steps to prevent innocent children of our country to suffer and succumb to kerosene poisoning. Kerosene should be classified as hazardous chemical. It should be dispensed in containers having pictorial warnings with skull and bones to deter children.

## REFERENCES

- Meyer S, McAdams AJ, Hug G. Unintentional household poisoning in children. *Klin Padiatr.* 2007;219:254-260.
- Shiamo W, Bucurales JC, Balistreri WF. Paraffin (kerosene)\* poisoning in under-five children: a problem of developing countries. *Int J Nurs Pract.* 2009;15:140-44.
- Krug A, Ginsburg CM, Moses SW. The impact of child-resistant containers on the incidence of paraffin (kerosene) ingestion in children. *S Afr Med J.* 2010;84:730-34.
- Sarker AK, Ghosh S, Barik K. A study of accidental poisoning (in children) in a rural medical college hospital of West Bengal. *Indian J Public Health.* 2005;34:159-62.
- Thomas M, Zach MS, Atkinson SD. Profile of hospital admissions following acute poisoning-experiences from a major teaching hospital in south India. *Adverse Drug React Toxicol Rev.* 2000;19:313-17.
- Hamid MH. Acute poisoning in children. *J Coll Physicians Surg Pak.* 2005;15:805-8.
- Anwar S. Clinical Profile of Kerosene Poisoning in a Tertiary Level Hospital in Bangladesh. *Bangladesh J Child Health.* 2014;38:11-14.
- Thalhammer GH, Eber E, Zach MS. pneumonitis and pneumatoceles following accidental hydrocarbon aspiration in children. *Wien Klein Wochenschr.* 2005;117,150-153.
- Gupta P, Singh RP, Murali MV, Bhargava SK, Sharma P. Kerosene oil poisoning - a childhood menace. *Indian Pediatr.* 1992;29:979-984.
- Annobil SH, Ogunbiyi OA. Pulmonary Radiological changes in Kerosene poisoning in the Asir region of Saudi Arabia. *Ann Trop Pediatr.* 1991;11:391-395.
- Rashid MM, Hasan MA, Chowdhury FR. Childhood acute poisoning in a tertiary medical college hospital of Bangladesh. *Mym Med J.* 2007;16:12-14.
- Mahdi AH. Kerosene Poisoning in Children in Riyadh. *J of*

- Tropical Pediatrics. 2001;34:316-318.
13. Nouri L, Al-Rahim K. Kerosene poisoning in children. Postgraduate Medical Journal. 1998;46:71-75.
  14. Nagi NA, Abdullah ZA. Kerosene poisoning in children in Iraq. Postgraduate medical J. 1995;71:419-422.
  15. Shotar A M: Kerosene poisoning in children. A 6-year prospective study at the Princess Rahmat Teaching Hospital. Neuro-endocrinology letters. 2005;26:835-838.
  16. Mahjoob Al-Naddawi, Kerosene Poisoning In Children. The Iraqi Postgraduate Medical Journal. 2009;8:23-27.
  17. de Wet B, van Schalkwyk D, van der Spuy J, du Plessis J, du Toit N, Burns D. Paraffin (kerosene) poisoning in childhood—is prevention affordable in South Africa? S Afr Med J. 1994; 84:735–738.

**Source of Support:** Nil; **Conflict of Interest:** None

**Submitted:** 29-03-2016; **Published online:** 28-04-2016