

Social and Environmental Aspects of Kerosene Poisoning in Children in Jeddah

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ABSTRACT. The main objective of the present study was to identify the social and environmental aspects of kerosene poisoning in children, at King Abdulaziz Hospital (KAH), Jeddah. An open-ended questionnaire to the attending member of the family; by the attending physician in emergency was carried out in the Emergency Department KAH, during the period from April 1992 to May 1995. Kerosene poisoning was observed to be more common in children aged 1-3 years (86.5%), living in overcrowded homes (89.5%), with poor facilities (83.5%), and in homes where kerosene was stored in beverage containers easily accessible to the children, 80.5% of the families sought medical help within the first 2 hours after ingestion. Knowledge of toxic nature of kerosene was lacking in most of the families. The study indicated that kerosene poisoning was common in children of families living in overcrowded homes with minimum facilities, in which kerosene was easily accessible to children. Public awareness is needed to educate the families of the hazards of kerosene poisoning.

Keywords: Kerosene poisoning, Emergency, Overcrowded homes, Jeddah.

Introduction

Kerosene poisoning (KP), is reported as the most commonly ingested toxin in developing countries^[1,2,3], particularly in regions where it is used as a fuel for cooking, heating, lighting, and cleaning purposes; a common practice in parts of Saudi Arabia^[4,5,6].

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Kerosene is a hydrocarbon of aliphatic category with low viscosity, its toxicity is related to its volatility, and capability to cause pneumonia, central nervous system depression, and other clinical manifestation^[1], that sometime may be severe enough to cause death^[7]. This study was designed to obtain information on the extent of KP in children attending Emergency Department (ED) of King Abdulaziz Hospital (KAH), Jeddah, and to identify the predisposing factors of KP.

Methods

The study was conducted in the ED, of KAH, Jeddah, from April 1992 to May 1995. All the children with KP reporting to the ED of KAH during this period were identified. An open-ended questionnaire was used during the interview of the attending member of the family of the child with KP to obtain data on the following factors: age and gender, time of ingestion, nationality, family income, type of housing and number of rooms, size of the family, child's caretaker, mother's activity, place of storage of kerosene, and family management after intoxication (home remedy and/or time taken for seeking medical care).

The collected data was entered using Data Base IV, 2.0 for DOS programme. The results were generated through simple statistical methods.

Results

During the study period, 184 children with intoxication were seen in the ED, 74 (40.2%) of them were due to kerosene ingestion. A total number of 74 children with KP of the age 10 months to 12 years were initially included in the study. Data were incomplete or missing for 7 children; therefore, they were excluded from the study. The majority of children with KP were toddlers (age 1-3 years [86.5%]), with a male to female ratio of 1.76:1. By nationality, 56.7% of the children with KP were Saudi (Table 1).

TABLE 1. Patient's Data.

Total	Age group				Gender		Nationality	
	< 1 Year	1 - < 3 Years	3 - < 6 Years	6 - 12 Years	Male	female	Saudi	Non-Saudi
67	3	58	4	2	42	25	38	29
100%	4.5%	86.5%	6%	3%	62.7%	37.3%	56.7%	43.3%

The time of ingestion showed two peaks during the day [between 1200-1600 hr in (43.4%), and 1800-2200 hr in (35.5%)]. The family data demonstrated that homes of minimal facilities status accounted for 83.5%, in which 86.5% of the homes consisted of 2-3 rooms, and 89.5% of children with KP were coming from a family size of 5-8 persons (Table 2). The caretaker for these children was the mother in the majority of cases (92.5%). In 97% the families of the children with KP, the combined income was less than SR. 3000 (Table 3).

TABLE 2. Type of homes by number of rooms and family size.

	Type of home	No. of rooms		Family size	
		Flat	11 (16.5%)	Two	14 (21%)
Traditional	56 (83.5%)	Three	44 (65.5%)	Five	24 (36%)
		Four	9 (13.5%)	Six	11 (16.5%)
				Seven	12 (18%)
				Eight	13 (19.5%)
				Nine	2 (3%)
				>Nine	1 (1.5%)

TABLE 3. Family Data.

Caretaker		Mother activity		Family combined income	
Mother	62 (92.5%)	House Wife	62 (92.5%)	Low	16 (24%)
Sibling	3 (4.5%)	Employed	4 (6%)	Enough	49 (73%)
Grand Mother	2 (3%)	Divorced	1 (1.5%)	>Enough	2 (3%)

Kerosene was stored in beverage containers (94%), and the containers placed in the kitchen (58%), or in the courtyard (33%). The quantity of kerosene ingested as reported by the attending member of the family was less the 15 ml in the majority of cases (85%) (Table 4). The majority of families did not attempt any measures to treat the child at home (67%), while the rest tried some home remedy, such as giving milk to the child (15%) (Table 5).

TABLE 4. Toxicological Data.

Container		Place of storage		Quantity ingested	
Water bottle	39 (58%)	Kitchen	39 (58%)	<5 ml	19 (28.5%)
Glasses	24 (36%)	Courtyard	22 (33%)	5 - 10 ml	15 (22.5%)
Non beverages		Balcony	3 (4.5%)	10 - 15 ml	23 (34%)
Containers	4 (6%)	Others	3 (4.5%)	>15 ml	10 (15%)

TABLE 5. Family first Aid.

Home remedy		Time of seeking medical Care	
None	45 (67%)	<2 hr	54 (80.5%)
Introducing Emesis	6 (9%)	2 - 4 hr	10 (15%)
Given Milk	10 (15%)	4 - 6 hr	1 (1.5%)
Given Water	2 (3%)	6 - 8 hr	0 (0%)
Given Juice	3 (4.5%)	8 - 12 hr	2 (3%)
Given Yogurt	1 (1.5%)	>12 hr	(0%)

Nevertheless, 80.5% of the families sought medical care within the first 2 hours of ingestion of kerosene by the child, and up to 95.5% of the families, within the first 4 hours (Table 5).

Discussion

KAH is a general hospital that serves mainly the Southern part of Jeddah, where most of the population are emigrants from within the Kingdom and neighboring countries.

Most of these people live in overcrowded traditional houses with minimal facilities. This study has shown that KP is the most common cause of poisoning and accounts for 40.2% of all incidents of poisoning in the population examined. This is a high incidence when compared with other similar studies from the Kingdom^[4-6,8,9], as well as from other countries^[10-15], although a study from AL Hafouf^[5] (Saudi Arabia) reported similar incidence (see Table 6).

TABLE 6. Comparison of different studies on the percentage of kerosene to all accidental poisoning in childhood.

Riyadh ^[6]	Tabuk ^[11]	Aramco ^[10]	Hafouf ^[5]	Qatar ^[14]	Iraq ^[10]	USA ^[15]	This Study
25%	10.3%	11.5%	41%	13.6%	5%	4.9%	40.2%

The present study concurs with other published studies in that KP is largely confined within the toddler age group (age 1-3 years), with a male to female preponderance^[1-3,8,9]. At this age group, the close contact with the mother becomes less, and the discriminative ability of the child is still not well developed. Most of these children come from families of low income status as judged by the father's occupation and family income, as well as by the living conditions (i.e. overcrowded houses with minimal facilities)^[9].

In the majority of the cases, kerosene was mainly stored in "beverage" containers (glasses or water bottles), and placed on the floor of the kitchen or in the courtyard. The latter makes it easily accessible to the children; this was obviously an important predisposing factor in KP and confirmed the possibility that children drank kerosene mistakenly as water when they were thirsty.

The time of ingestion had two peak hours during the day: (12:00 - 16:00 and 18:00 - 22:00 hrs), suggesting that the caretaker (often the mother), is resting or is occupied by other household chores, leaving the child to play unattended. Most of the cases were brought to the ER within 2 hours of the incident, which shows fairly good judgement by the family. The home remedies given by the families as first aid show different approaches: this reflects the lack of knowledge of the toxic nature of kerosene. The latter is a point that should be addressed in any preventive programme to educate the families.

As KP still remains an important cause of morbidity and potential fatality^[4,7,10], it is suggested that efforts at prevention are extremely pertinent. Therefore, the followings are recommended to be part of a preventive programme:

1. Parent education. To be introduced during visits to the Primary Health Care Centers for immunization, and subsequently reinforced during follow-up visits by:
 - i. Explaining the hazards of KP to the families,
 - ii. Educational pamphlets to warn the public about the hazard, of inappropriate kerosene storage and the appropriate storage methods,
 - iii. Encourage the use of alternate fuel(s) for cooking and heating, which may decrease episodes of KP^[12],
 - iv. Public awareness of the hazards of kerosene in the community through mass-media and advertisements.

2. Control of sale and supply of kerosene. By ensuring that kerosene is sold or supplied in 'child resistant' containers.

Labeling containers for kerosene that "the contents are a hazardous substance" in Arabic and other commonly used languages.

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الجوانب الاجتماعية والبيئية لحالات التسمم بمادة الكيروسين في الأطفال بمدينة جدة

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المستخلص : إن الهدف الرئيسي للدراسة الحالية هو التعرف على العوامل الاجتماعية والبيئية التي تحيط بحالات التسمم بمادة الكيروسين بين الحالات المقاومة للعلاج لمريض قسم الطوارئ بمستشفى الملك عبد العزيز بجدة - المملكة العربية السعودية. فلقد تم دراسة 67 حالة أطفال حتى سن 18 عاماً، حصل لهم تسمم بمادة الكيروسين تم الكشف عليهم وعلاجهم خلال فترة من إبريل 1992م حتى مايو 1995م. ووجد أن التسمم بمادة الكيروسين أكثر انتشاراً بين الأطفال الذين تتراوح أعمارهم بين 1 - 3 سنوات (5, 86٪)، ويعيشون في منازل مزدحمة (5, 89٪)، ومنازل شعبية والتي ينقصها التسهيلات المنزلية لحفظ المواد (5, 83٪)، كذلك الاحتفاظ بمادة الكيروسين في أوعية للشرب وفي تناول الأطفال (94٪)، كما أن معظم الأسر أحضرت أطفالها إلى قسم الطوارئ خلال ساعتين من التسمم (5, 80٪) إلا أن معظم هذه الأسر تجهل خطر وجود الكيروسين في منازلهم. وتوضح هذه الدراسة أن التسمم بمادة الكيروسين شائع بين الأطفال الذين يأتون من مجتمع اقتصادي منخفض الدخل ويعيشون في منازل مزدحمة ينقصها التسهيلات المنزلية، حيث أن مادة الكيروسين غالباً ماتكون محفوظة في أوعية لشرب الماء في تناول الأطفال. لهذا من الضروري إيجاد برنامج وقائي يعني بتوجيه الأهل لهذه الظاهرة، وكذلك إيجاد ضوابط عند تزود المستهلك بمادة الكيروسين حيث أن هذه العوامل ستكون لها الفاعلية الكبيرة في تخفيض حالات التسمم بمادة الكيروسين.