

ORIGINAL ARTICLE

ACCIDENTAL POISONING IN CHILDREN BELOW 12 YEARS ADMITTED IN SEREMBAN HOSPITAL 1994-1995

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ABSTRACT

Accidental poisoning in children is a preventable condition. It is a problem mainly in children aged 1 to 4 years. This is a descriptive study of accidental poisoning in children below 12 years old admitted to Hospital Seremban from October 15, 1994 to October 14, 1995. A major cause of household accidental poisoning was kerosene ingestion (25%) followed by ingestion of medications (22%), liniment methyl salicylate (12%), mothballs (12%) and hypochlorinate solution (9%). There was a higher incidence of poisoning in males (50.8%), among Indians (41.2%) and in children from lower social classes (67%). A greater proportion of the accident occurred when the child was taken care by the parents (53%) and in the house (80%). Most of the poison was ingested from its original package (81%). The immediate action taken was sending the child to the hospital (75%) without carrying out other actions such as washing the child's mouth. The delay of sending the child to hospital was due to husband not at home (57%). Most of the cases (72.1%) were discharged well within 1-2 days following admission.

Key words: accidental poisoning, preventable condition, toddlers, carer, kerosene, medications, liniment methyl salicylate, mothballs

INTRODUCTION

Accidental poisoning has been a problem particularly among children under the age of 5 years¹. This is primarily due to developmental incompetence² and their dependence on adults for their care and well being³. It continues to be an important cause for medical attention in preschool children, although the mortality has decreased⁴.

In the United States, for every death due to poisoning among children under 5, it is estimated 80,000-90,000 non-fatal poisoning cases seen in emergency rooms. A study in England and Wales⁵ observed that mortality from accidental poisoning in children 0-4 years old fell marginally from 4.5 deaths per million in 1968 to 4.0 deaths per million in 1977. A study done in Sri Lanka⁶ in 1986 showed cases below 15 years old constituted 11.4% of the total cases with a case fatality rate (below 15 years old) of 3.2%. Studies done by Azizi, et al^{7,8} does not show any trend of poisoning occurrence in Malaysia.

Accidental poisoning in children below 12 years old constitutes 24.5% of poisoning cases in Negeri Sembilan, with Tampin accounting for highest proportion 56.0% while Seremban was the lowest proportion 17.7%⁹.

Accidental poisoning in children is a preventable condition. A major cause of household accidental poisoning that is most commonly implicated is kerosene. Common medications such as vitamins, iron supplement, analgesics, antipyretics and hypnotics and household cleansing agents also often implicated. Important factors associated with accidental poisonings were gender

where preponderance to male has been noted^{4,6,9,10}. In Malaysia, Azizi, et al⁸ showed a higher incidence among Indians while another study showed the incidence was higher among Malays⁷. It is difficult to determine the occurrence of poisoning cases between urban and rural locations or by geographical regions. Azizi, et al⁷ also showed no significant difference between cases and controls with regard to social class, while another study⁸ showed that children from lower social classes had a higher risk of accidental poisoning.

The objective of the study is to describe the demographic distribution of accidental poisoning in children less than 12 years old admitted to Seremban Hospital. It will also determine the factors associated with the poisoning and knowledge of carers about poisoning.

MATERIALS AND METHODS

This is a descriptive study involving children below 12 years admitted to Seremban Hospital for accidental poisoning from October 15, 1994 to October 14, 1995.

Data was obtained from the State Health Office on number of poisonings occurring in each district in Negeri Sembilan. Records of accidental poisoning admitted to Seremban Hospital were obtained from Medical Record Unit. Those accidental poisonings aged 12 years old and below were chosen.

A questionnaire was constructed in Bahasa Malaysia and pre-testing was carried out on ten carers of children admitted to Seremban Hospital. Trained interviewers interviewed parents at their homes. In addition, the interviewers gathered further

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Table 1: Distribution of cases with age and gender

Age/yr	<1year	1-4 years (toddler)	5-6 (preschool)	7-12 (school aged)	Total
Male	3 (4.4%)	29 (42.6%)	0	2 (2.9%)	34 (50%)
Female	4 (5.9%)	21 (30.9%)	1 (1.5%)	8 (11.8%)	34 (50%)
Total	7 (10.3%)	50 (73.5%)	1 (1.5)	10 (14.7%)	68 (100%)

information through observations and inspection of their home.

Dbase III and Epi-Info Version 6 programs were used for data entry and analysis. Literature review was done continuously throughout the survey period.

RESULTS

There were 68 cases of accidental poisoning identified during this period. The youngest case was 6 months while the oldest was 11 years. Accidental poisoning occurred mostly among toddlers (1-4 years). The mean age is 38.2 months (standard deviation, s.d.= 37.2 months) and the median 24 months.

There were equal numbers of males and females affected in this study. However among children 5 years and 7 years and below, more males were affected, 56.1% and 55.2% respectively (Table 1)

There were more Indians 28(41.2%) compared to Malays 26(38.2%) and Chinese 13 (19.1%). One case (1.5%) of an Orang Asli affected. There were 58(85.3%) were preschool children (below 7 years) and 10(14.7%) cases (7 years old and above), were schooling in primary school. (Table 2).

Table 2: Distribution of cases by ethnic group and schooling status of child

	No. of cases (%)	Total
Ethnic group		
Indian	28 (41.2%)	68 (100%)
Malay	26 (38.2%)	
Chinese	13 (19.1%)	
Others	1 (1.5%)	
Schooling Status		
Not schooling	58 (85.3%)	68 (100%)
Schooling	10 (14.7%)	

The socio-economic status was based on the father's occupation, education level and estimated family income. Most fathers (77.9%) were 'non-skilled' workers including rubber tappers, lorry drivers, office boys and medical attendants. Only (22.1%) of the fathers were skilled workers. All the fathers were employed. One father did not have education at school while the rest had either primary level (55.9%) or secondary level education (42.6%).

The modal monthly family income was between RM500 and RM999 per month (66.2%). The mean income was RM847.2 (s.d.=RM267.1) while the median income was at RM800 per month (Table 3).

Table 3: Distribution of cases by parent's occupation, education level and monthly family income

Number of cases (%)	Father's	Mother's
Category of Occupation		
Non skilled	53 (77.9)	-
Skilled	15 (22.1)	-
Working	-	36 (52.9)
Not working	-	32 (47.1)
Education Level		
Never gone to school	1 (1.5)	23 (33.8)
Primary school	38 (55.9)	32 (47.1)
Secondary school	29 (42.6)	13 (19.1)
Monthly Family income (RM)		
0 - 499		1 (1.5)
500 - 999		45 (66.2)
1000 - 1499		19 (27.9)
1500 - 1999		3 (4.4)
2 000 >		0 (0.0)

The mothers' ages ranged from 20 years to 42 years with a mean age of 29.1 years (s.d.=5.8 years), a median age of 28 years and a modal age group of 25-29 years (35.3%). 47.1% of the mothers attended primary school, 33.8% had no schooling while 19.1% had secondary school education. 47.1% of cases had working mother (Table 3).

Table 4: Distribution of poisons and related events

	Types of poison – number (%)							total
	kerosene	Medica-tions	LMS	Moth-balls	Hypocl. Soln.	Herbi-cides	others	
Age	2	1	-	1	-	1	2	7
<1yr	(2.9)	(1.5)		(1.5)		(1.5)	(2.9)	(10.3)
1-4	14	11	6	6	5	3	5	50
	(20.6)	(16.2)	(8.8)	(8.8)	(7.4)	(4.4)	(7.4)	(73.5)
5-6	-	-	-	-	-	1	-	1
						(1.5)		(1.5)
7-12	1	3	2	1	1	-	2	10
	(1.5)	(4.4)	(2.9)	(1.5)	(1.5)		(2.9)	(14.7)
Total	17	15	8	8	6	5	9	68
	(25.0)	(22.1)	(11.8)	(11.8)	(8.8)	(7.4)	(13.2)	(100)
Original Package	7	14	8	8	5	-	10	55
	(12.7)	(25.5)	(11.8)	(11.8)	(7.4)		(14.7)	(80.9)
Location where poisoning happened			Kitchen				28 (41.2)	
	Inside the house		Storeroom				12 (17.6)	50
			Bedroom				10 (14.7)	(73.5)
	Outside the house		At the back of the house				18 (26.5)	18
								(26.5)
Carers	Parents							36
								(52.9)
	Others		Older siblings			5 (7.4)		32
			Grandmother			17 (25.0)		(47.1)
			Babysitter			10 (14.7)		
Carers doing		Doing housework				29 (42.6)		68
		Sleeping/ resting				14 (26.6)		(100)
		Working outside the house				25 (30.8)		
Actions		Took child immediately to hospital				52 (76.5)		68
		Wash child's mouth/ induce vomiting				16 (23.5)		(100)
Time taken to reach hospital		30 – 60 minutes				40 (58.8)		68
		1-3 hours				21 (30.9)		(100)
		3-6 hours				4 (5.9)		
		More than 6 hours				3 (4.4)		
Reason for delay		Husband not at home				17 (25.0)		68
		Transportation problem				11 (16.2)		(100)
		No specific reason				40 (58.8)		
Duration of hospital stay		1 - 2 days				49 (72.1)		68
		3 – 7 days				19 (27.9)		(100)

The most frequently ingested poison was kerosene, followed by medications, LMS, mothballs, hypochlorinate solution and herbicides. There were 73.5% involving toddlers (1-4 years old), 14.7% involving 7-12 years old and 10.3% of poisoning involving children below 1 year old, with distribution of poison as in Table 4. 76.4% of the male children and 85.3% of the female children experienced poisoning while inside their house. Out of these, 41.2% occurred in the kitchen, 17.6% occurred in the storeroom and 14.7% occurred in the bedroom.

In 80.9% of the cases, the poison was ingested directly from its original package. Out of those cases that ingested poison from other than its original container, 76.9% involving kerosene contained in soft drink bottles.

Based on the observation during the survey, in 97.1% of the cases, hypochlorinate solution were kept on the bathroom floor. 80.9% of cases, the medications were placed in unlocked cupboard or in the refrigerator. 54.3% of the cases, kerosene were placed on the kitchen floor or at the back of the house. 6.2% of the cases stored herbicides in unlocked cupboards that were easily accessible to the child.

52.9% of the children were taken care by their parents at the time of poisoning compared to 47.1% were taken care by other persons such as older siblings, grandmother and babysitter. These carers were either busy doing other things rather than focusing their attention towards the children.

Sending the child immediately to the hospital was the most common option taken (76.5% of the cases). Other actions such as washing the child's

mouth or making the child vomit first before taking the child to the hospital were carried out.

58.8% of cases were brought to the hospital within 30-60 minutes of the accident, 30.9% of cases took 1 to 3 hours while 10.3% cases took 3 hours and more to reach the hospital. The major reasons for delay to be brought to hospital were the spouse being not at home in 25.0% and due to problems in transportation in 16.2% of the cases.

72.1% of the cases were discharged well within 1-2 days following admission and 27.9% were discharged well between 3-7 days of their admission.

58.8% said they never knew about poisoning before. 22.1% didn't know that poisoning in children is preventable. The knowledge of the respondents was limited to obvious poisons like herbicides, followed by fertilizers and hypochlorinate solution as being poisonous. Only one each of the respondents were aware that medications like oral contraceptives, antihypertensives, paracetamol and vitamin tablets are potential poisonous agents.

92.6% of the respondents said that parents should know about first aid. However, 66.2% of them claimed they would send the child to nearest clinic or hospital immediately without doing first aid. None of them cited that they would send the child to an alternative practitioner.

DISCUSSION

Accidental poisoning is important healths threat in children especially those below 5 years old. The results of this study correspond in some aspects of the studies done in countries elsewhere^{10, 12} and in Malaysia^{7, 8}. It also suggested that the causes of accidental poisoning were similar. This study showed that accidental poisoning occurred mostly among toddlers 73.5%. This finding is similar to that in several other studies done overseas^{10, 11, 12} and studies done in Malaysia too^{7, 8}.

In this study the proportion of boys and girls affected were equal, but studies done elsewhere^{11, 12, 13, 14} and in Malaysia^{7, 8} have shown that more boys than girls were affected. The findings of the present study may be due to the small number of cases being studied. However one of the studies⁷, was done on a younger age group (0-7 years), and so probably the sex ratio is different compared to this study. In fact, when the cases blow 7 years in the present study is considered, more boys (55.2%) were involved.

In this study, there were slightly more Indians compared to Malays and Chinese involved in accidental poisoning. This finding is similar to study done in Kuala Lumpur Hospital⁸. This is in part probably because many cases were referred from estates where larger proportion of Indians live. Many of the Indians involved were of low socio-economic status^{8, 10} with low levels of knowledge regarding poisons and there were poor supervision of their children. However, another study⁷ showed

slightly higher proportion of accidental poisoning in Malays (48.3%) compared to Indians (32.9%) and low in Chinese (18.8%). These findings could be because the Malays and Indians use government hospitals.

In this study, the mothers of cases had a mean age of 29.1 years. Other studies^{7, 8} showed a higher proportion of cases having mothers in the age group of 21 years old. This could be because these studies^{7, 8} were done on younger children (age 7 and below) compared to this study, which also included children up to 12 years. Therefore the mothers of this study are of older age compared to those mothers in the other studies.

The cases of accidental poisoning also occurred more in non-working mothers (52.9%) compared to those who are working (47.1%). This is probably because being predominantly housewives, they are busy doing housework (42.6%) or doing some work outside the house (36.8%) while supervising the child at the same time. Whereas the working mothers however have their children looked after by carers who spend more of their time supervising the children as their main task.

Kerosene ingestion as a source of poisoning is common in children as observed in Malaysia^{7, 8} Sri Lanka⁵, Denmark¹⁴ and India¹⁵. The most frequently ingested agent in this study is kerosene and 80.9% of the agents were ingested from its original containers. As in Malaysia^{7, 8} and elsewhere kerosene is often mistaken as a soft drink since it may be purchased in soft drink bottles.

This is followed by medication agents such as liniment methyl salicylate ointment. The increasing involvement of medication or pharmaceutical products as a cause of poisoning is also common elsewhere^{4, 15, 16, 17}. This was also observed in this study. This is due to availability of these medications in containers that are not child proof⁷. Other agents involved were mothballs and hypochlorinate. It was observed that these agents were kept in unsafe places, which were within the child's reach with the children may be left alone and unsupervised. However studies from America found that availability and accessibility of potentially toxic substances in the home is not associated with accidental poisoning^{18, 19}.

Children are dependent on adults for safety and well being. In this study, the carers were busy either doing housework (42.6%) or doing some work outside the house (30.8%) or were sleeping (26.6%) at the time of the poisoning event. These are evidences of lack of supervision by carers or that the carers were temporarily distracted during that time thus contribute to accident. Much medication appeared like 'candy' to the child. Certain poisons that appear as food items like a pesticide resembling peanut butter placed on crackers might lead to child taking them.

CONCLUSION

Lack of awareness and knowledge on potential poisoning may contribute to accidental poisoning. The carers had limited knowledge on poisonous agents except for herbicides and fertilizers. While a higher proportion of carers (92.6%) say that parents should know the first aid for accidental poisoning, 94.1% of them felt that first aid for poisoning is the responsibility of the husband. All the respondents were dependent on the health care system, and would seek care in the hospital and are seen by a doctor in the event of poisoning.

Kerosene is stored safely in about 50% of the cases. This corresponds closely to the knowledge levels that kerosene is a poison. At least 98.5% of cases stated that herbicides were poisons, but only 2.7% stored the herbicides safely. Probably the respondents do not actually know how to store herbicides safely or there was a biased response when asked if herbicides are poisons. On the other hand they may be of the opinion that the risk of poisoning was low especially herbicides as opposed to medications. A more detailed probing in the future studies may provide answers to these conflicting approaches and knowledge. It was noted that knowledge on accidental poisoning was poor among the guardians other than sending the child immediately to hospital. The knowledge on safety measures like keeping potential poisonous agents in proper places was lacking. The accessibility of drugs and household products to children could not be evaluated because the agents had been removed at the time of interview.

The approach carried out in Sweden²² where their preventive work was channeled through safety organization, professional groups, voluntary organizations, schools, child welfare centers and local community groups.

Public education programs in which the target groups include public health workers, parents and carer(s) of the children should be done. Other measures recommended are safe home environments, responsibilities of manufacturers to provide child-safe cabinets and cupboards, child resistant closure caps, clear labels with directions for use, precautionary steps and first aid information, legislations should be followed by strict enforcement, active Poison Center should be set up in each states or regionally and 'on-line' notification system to ensure adequate surveillance.

More research on poisonings should be done specifically on accidental poisoning in children below 5 years old. At present there is insufficient data on poisoning in children either in urban or rural areas in different parts of Malaysia. Further, comparative studies should be done on child's behavioral characteristics and recent stressful events in the family that could be significant predisposing factors to accidental poisoning in children especially below 5 years old.

ACKNOWLEDGEMENT

I am grateful to my supervisor Associate Professor John T. Arokiasamy for all his advice, support and patient guidance throughout the preparation of this paper. My special thanks to the Deputy Director of State Health of Negeri Sembilan and the Director of Seremban Hospital for their permission, staffs of Medical Record Office for their support and cooperation for the completion of this study.

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