Research Article

Epidemiology of Accidental Poisoning in a Sample of Iraqi Children

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Abstract

Background: acute poisoning is an important cause of morbidity and mortality in children all over the world.
Objectives: to find out the types of acute accidental poisoning (AAP) in children in Baghdad and various host and environmental factors responsible for.
Method: one hundred and seventy poisoning cases and hundred controls were enrolled in a case control study done in central pediatrics teaching hospital for the period from 1st of Jan. 1998 to 30th of April 1998.
Results: kerosene poisoning was the commonest type (56.4%) followed by drugs (23.5%) then organophosphorus insecticides (11.8%), household products (3.5%). The highest frequency was noticed at 8.00 am-12.00 noon followed by 12.00 noon – 4.00 pm. It has been found that there is no significant relationship between poisoning and sex of child, mother educational level but the followings found to be significant risk factors: age of 1-3 years followed by 3-5 years, urban residence, peak time of poisoning was during mid-morning hours and early afternoon, also order of the child (5th) besides family size (family of 4-7 members), mother's age of above 35 years, not working mother (housewife). Also it showed a relation with recurrence of poisoning in the same child (7.1%) or other sibling in the same family (16.5%) , being at home (86,5%) and use inappropriate method of storing and placing poisonous materials.
Conclusion & recommendations: significant risk factors regarding younger age, larger family size, early day time occurrence and recurrence of accidents in the same family, in addition to improper storage places necessitate the need for earlier poison prevention education programs as an integral part of well child visits even before child is mobile.

Keywords: accidental poisoning, risk factors

INTRODUCTION

of the >2 million human poisoning exposures reported annually to the Toxic Exposure Surveillance System (TESS) of the American Association of Poison Control Centers (AAPCC), >50% occur in children 5 yr of age or younger. Almost all of these exposures are unintentional and reflect the propensity for children in this age group to put virtually anything in their mouths.[1] One category of major importance, unintentional poisoning, constitutes about 2% of all injury deaths in developed countries and about 5% in less developed ones.[2]. This reduction in death due to unintentional poisoning in young children becomes uncommon owing to increased product safety measures (child-resistant packaging), increased poison prevention education, early recognition of exposure, improvements in medical management, and the availability of 24 hr/day, 7 day/wk 800 number access to regionally based poison control centers.[1] Basing on these facts we find it essential to review the host and environmental factors for the AAP in our community aiming for possible prevention of this problem since the general beliefs that preventive strategies are more effective when high risk children or external predisposing conditions are targeted. Epidemiological properties defer from country to country that necessitate knowing our own risk factors.

Aim of the Study: In order to find out the types of acute accidental poisoning (AAP) and various host and environmental risk factors responsible for poisoning in children admitted to the Central Teaching Hospital for Children in Baghdad.

PATIENTS AND METHODS

A case control study was done on one hundred and seventy cases of AAP admitted to the emergency unit of the Central Teaching Hospital for Children in Baghdad and another one hundred children attended the outpatient department for any cause Other than poisoning over a period of four months (from 1st of Jan. 1998 to 30th of April 1998).

A special questionnaire was used including: age, sex, residence, family size (number of children in the family and sequence of the child in the family), mother's age, job, and education, place where poisoning occurred, time when poisoning occurred, type of poisoning, container (locked or not) and period of exposure in cases of CO poisoning.

Children were up to 12 years, history was taken from the parents, no toxicological study has been done. Those with food poisoning were excluded from the study.

The collected data was analyzed using chi square method. P value is considered significant if it is less than 0.05 and highly significant if less than 0.001.

In the peroxidase secondary detection system, the presence of a brown reaction product at the site of the target antigen is indicative of positive reactivity. Counter stain will be pale to dark blue coloration of the cell.

RESULTS

Hydrocarbons mainly kerosene constitute the most common poisoning (96 case -56.4%-) followed by drugs then insecticide, household products, CO poisoning, rat killer in a percentage of 23.5%, 11.8%, 3.5%, 2.4%, and 2.4%, respectively as shown in table 1.

Table 1. Types and frequency of poisoning

Rank	*Type of poisoning*	*No. of cases*	*(%)*
1.	**Hydrocarbons** Kerosene Gasoline	**96** 95 1	**56.4** **55.8** **0.58**
2.	**Drugs**	**40**	**23.5**
3.	**Organophosphorus (insecticide)**	**20**	11.8
4.	**House hold products**	**6**	**3. 5**
5.	**Rat killer**	**4**	**2.4**
6.	**CO poisoning**	**4**	**2.4**
	Total	**170**	**100**

There was a significant association of AAP with age of children since it was more frequent in toddlers (1-3 years) (82=48%) followed by preschool age (3-5 years) (63 =37%) as shown in Fig. (1)

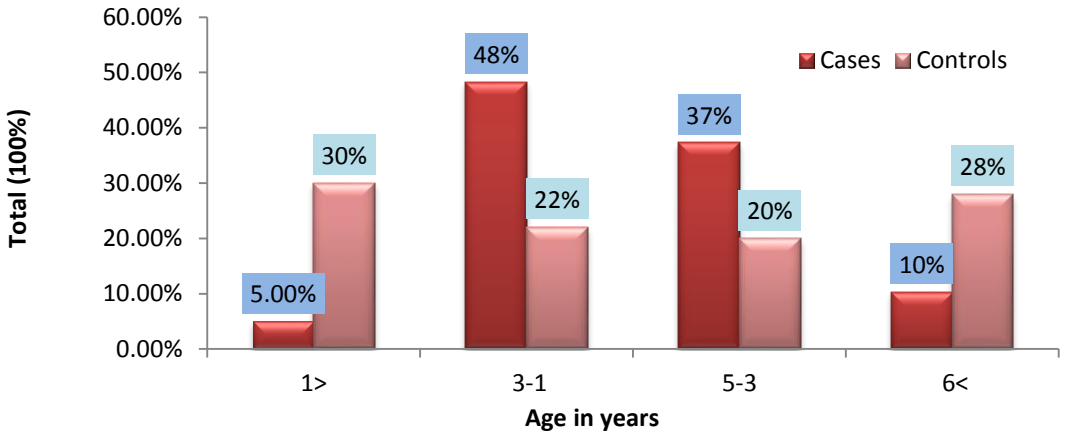

Fig. 1. Age of cases and control

A significant difference was noticed between cases and control regarding residence (P=0.001) where most of poisoning cases occurred in urban areas (148 cases (87%)) as shown in fig. (2).

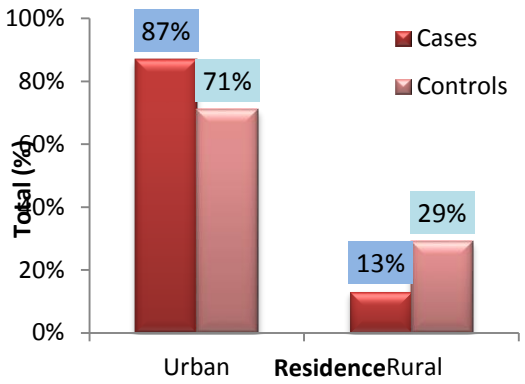

Fig. 2. Residence of cases and control.

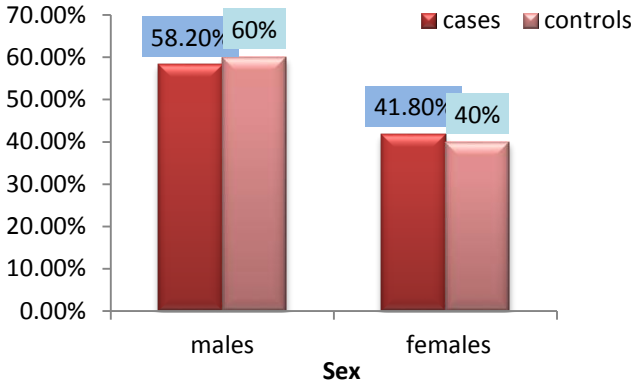

Fig. 3. Sex of cases and controls

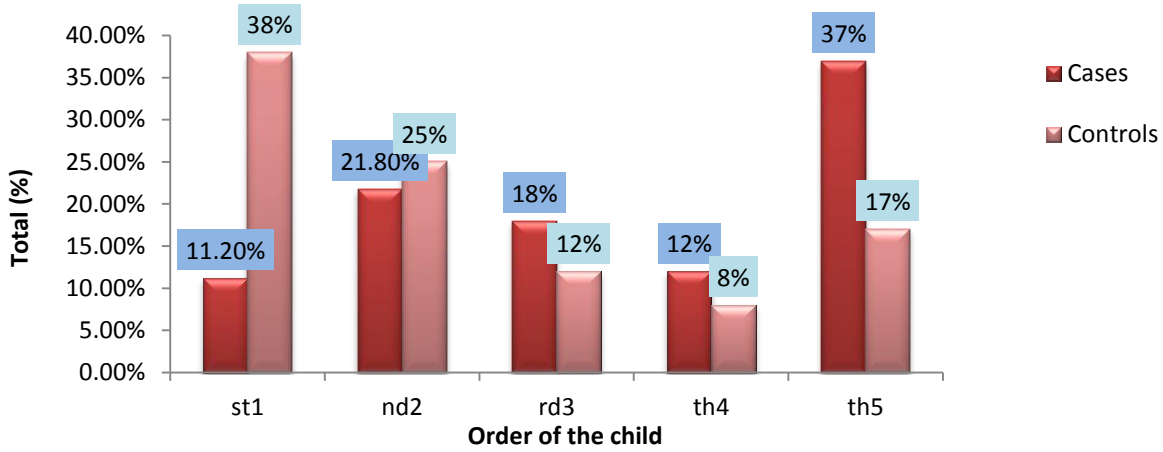

Fig.4: Child's order in cases and controls

There was no significant association between incidence of AAP and the sex of children since male predominance was found in cases as in controls (P value 0.571) as seen in fig. (3).

Another finding was the significant difference between cases of AAP and the controls regarding the order of the child in the family. The sequence of majority of children with AAP were fifth and more (64 cases, 37%) as seen in fig. (4).

Family size found to be an important risk factor that the majority of children with AAP belong to family size 4-7 (119 cases ,70%) as shown in fig. (5).

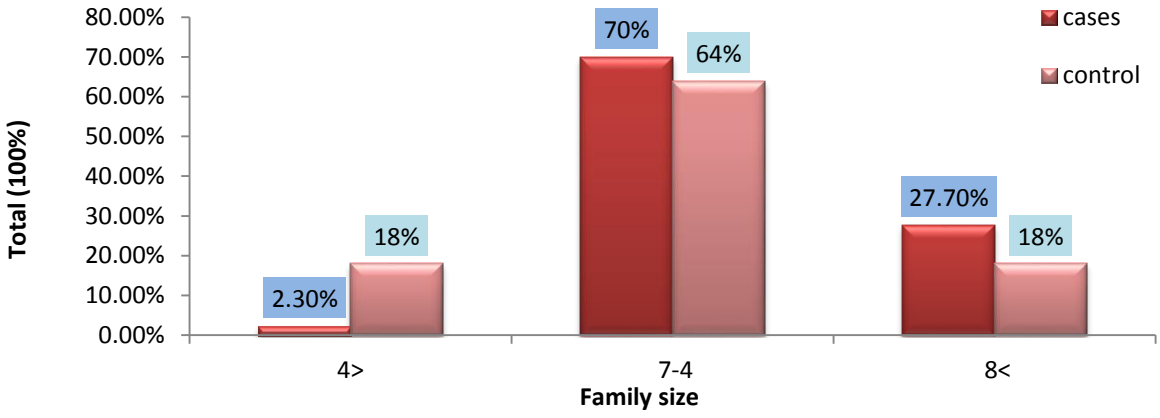

Fig. 5. Family size for cases and control

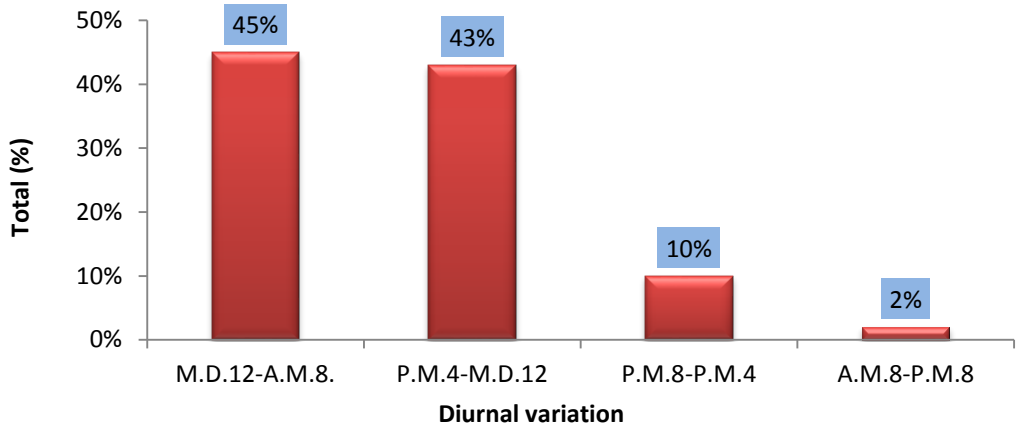

Fig. 6. Diurnal variation in cases

Peak incidence of cases was found at 8.00 A.M. -12 M.D. (77 cases, 45%) and followed by time between 12 M.D. – 4 P.M. as seen in fig. (6)

Other finding was the peak incidence of AAP which occur in children belong to mothers aged 25-35 years (84 cases, 49%), but significant difference between cases and controls was seen in children belong to mother > 35 years, as seen in fig. (7).

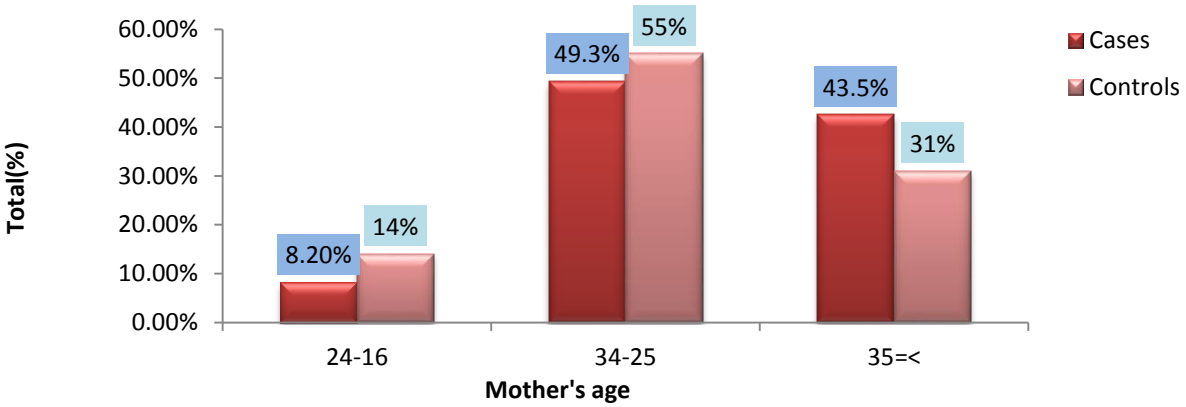

Fig. 7. Mother's age in cases and controls

Regarding mother's education, there was no significant difference between cases and controls, as shown in fig. (8).

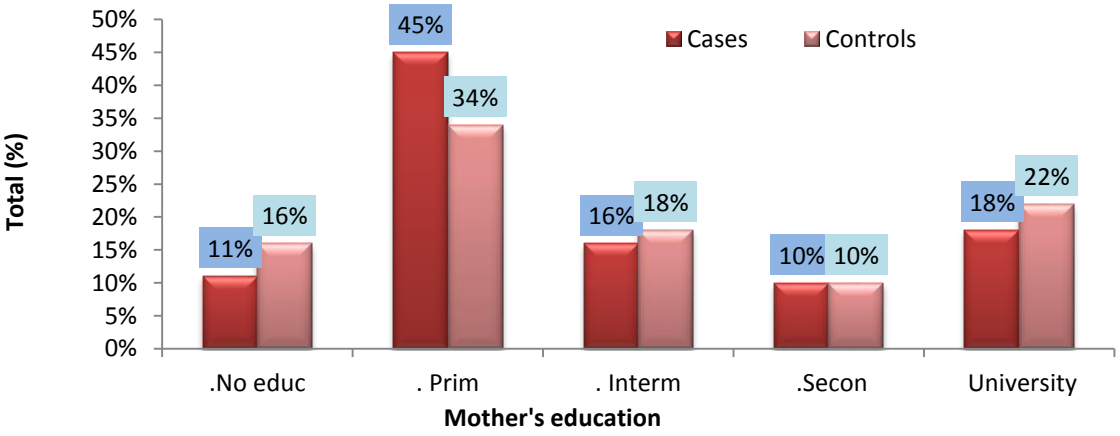

Fig 8. Mother's education in cases and controls

Also the present study shows significant difference between cases and controls and peak incidence of poisoning occur in children of housewives mothers as shown in fig 9.

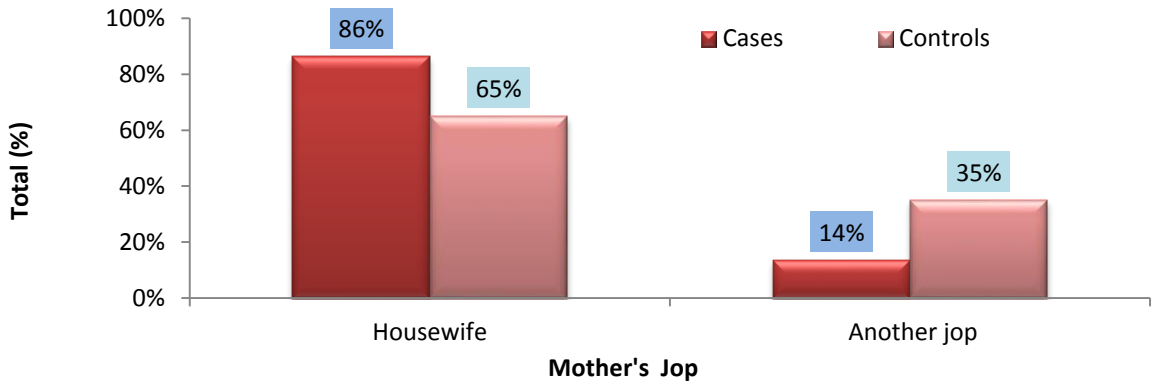

Fig 9: Mother's job in cases and controls

This study shows only 7.1% of children have recurrence of poisoning in the same child and 16.5% of poisoning recurred in other sibling, as shown in table 2.

Table 2. Previous history of poisoning in the same child or other sibling in cases

Previous history of poisoning	Positive		Negative		Total
	cases	%	cases	%	
Same child	12	7.1	158	92.9	100%
Other sibling	28	16.5	142	83.5	100%

Regarding the place where poisoning occurred, this study shows that 147 cases (86.5%) poisoning occurs at child's home, 18 cases (10.6%) occurs at relative's houses during visiting them, and 5 cases (2.9%) in other places like in school, street, as shown in table 3.

Table 3. Place where poisoning occurs

Place of poisoning	Child's home	Relative's houses	Others	Total
cases	147	18	5	170
Percentage	86.5%	10.6%	2.9%	100%

All poisoning materials are stored in places other than proper ones. We find that those who were poisoned with kerosene 36 cases (65.6%) was drank from bottles (juice or oil bottles) & glasses used for drinking water, tea pots..etc while in 21 cases (21.8%) of containers are open barrels. Only 11 cases (11.4%) kerosene poisoning occurred accidentally by using rubber tubes as transferring kerosene from place to other, imitating parents

No drug accidentally poisoned was stored in a locked place or child resistant packaging. 3 cases, had been given by the mother, and all other cases occurred due to unlocked containers (including sheets of tablets or piece of paper or opened nylon bags). Majority of cases (26 cases, 65%) containers put on the table and on low cabinet and 6 cases (15%) inside hand bag. 3 cases (7.5%) under the pillow and only 2 cases (5%) of containers put in closed cabinets. The insecticides were put under or behind furniture in 10 cases (50%), other 9 cases (45%) the insecticides were put in bottles and only one case the poisoning was induced by mother during direct application of poisoning material to treat pediculosis. The rat killing poisoning was put in a plate under or behind furniture, as shown in table 4.

Table 4. Storage place of poisonous material

	Type of poisoning	Place of storage	No. of cases	(%)
1.	Kerosene		95	**100%**
		Drank from bottles (juice or oil bottles) & Water glasses, tea pots..etc	63	**65.6%**
		Opened barrels	21	**21.8%**
		Imitating parents in transferring kerosene from place to other by rubber tubes	11	**11.4%**
2.	Drugs		40	**100%**
		Accidentally given by the mother	3	**7.5%**
		Unlocked containers On table & low cabinet Inside hand bag Under the pillow Closed cabinets	37 26 6 3 2	**92.5%** **65%** **15%** **7.5%** **5%**
3.	Organophosphorus (insecticide)		20	**100%**
		Put under or behind furniture	10	**50**
		Put in bottles	9	**45**
		Induced by mother	1	**5**
4.	**Rat killer**	**Put in plate behind or under furniture**	**4**	**100%**

DISCUSSION

Identification and documentation of epidemiological aspects and other variables in childhood poisonings are of great importance for treatment plan and determination of proper preventive measures. However, it is very difficult to estimate the total number and epidemiology of childhood poisonings in Iraq, due to the lack of standardized registry. This study was performed in one of important teaching hospital that serve a wide area of south and west Baghdad and its draining areas. It may be a good representative of host and environmental risk factors. Hydrocarbons mainly kerosene constitute the most common poisoning 96 case (56.2%) followed by drugs then insecticide, household products, CO poisoning, rat killer, a result which is just similar to a study done by Al Hazmi A.M. in Saudia Arabia [3].

Kerosene is also implicated as a major cause of AAP in Kuwait, Ahwaz, Vienna (in 1978) and New Delhi, [4-8].

This result was not seen in United Arab Emirates, Oman, Turkey, and Greece where drugs was implicated as the major cause, due to changing in habits (kerosene is not the main source of energy for heating and cooking), changing in life styles, beside improvement in the socioeconomic state. Also the type of drug reflecting the common drugs used in each community [9-12].

All above studies reported that children less than 5 years (especially 1-3 y) are most often the victims so also our study (most common age was 1-3 years) which explained on the fact that those age group are almost rushing to explore new objects in addition to mouthing. Most of the previous investigators found a significant increase of AAP in males than females (M:F ranging from 1.3-1.7 :1) [3,4,6,8-12] , a finding which was not proved in our study, when we find no significant difference in gender between cases of AAP and control group although the M:F ratio was 1.4:1, which is the same gender ratio seen in the control group. Rodriguez *et al* [13] in united states, Paritsis *et al* [14] and Petridou *et al* [12] in Greece had a similar findings. This difference could be explained on the fact that our study was a case control one not just find the ratio M:F ratio of only the cases (just like Petridou *et al* [12] study). While a study conducted by Chatantiprapa *et al* from Thailand, which is also case control study, showed a slight female predominance[15]. The younger age group of AAP cases that we discovered have a relation to their developmental milestone (being investigator, curious and exploring their environment by putting objects into their mouth, who can't be warned against harmful products by a responsible caretakers) rather than their sex. In this study, it was so obvious that the urban environment is more hazardous since the more availability of poisonous substances.

In this study, there was significant deference between cases of AAP and the control regarding the order of the child in the family- being the fifth one- so also large family size (4-7 members), this is in agreement with Chatantiprapa *et al* study mentioned above.

Other literatures like Azizi *et al* from Malaysia reported that living in a household more than 5 occupants as a significant risk factor[16], so also Ozdogan *et al*[17] . Unagreed with Petridou *et al* findings, who showed insignificant sib ship with increase in AAP cases[12]. The increase in AAP with increase family size may indicate insufficient supervision especially for the youngest one who is usually-in our community- under the care of his older sister or brother in those large size families. Mother age was found to be significant for those whose mothers are older than 35 years, in spite of the fact that most accidental poisoning cases was belong to mothers aged 25-35 years, which follow the median age of mothering in our society. This unagreed with Chatantiprapa *et al* study who reported a similar median age for cases and controls[15]. This is difficult to be compared since we use different age groups distribution rather than median age only.

We showed no significant correlation between cases and controls with mother educational level, the same findings reported in Thailand[15] and Petridou *et al* [12], while Ozdogan *et al* from Turkey found that parents of most patients were uneducated[17]. This indicates that schooling is not a good indicator for educational level in our society, which necessitates the need for modification of our school educational programs Children of working mothers were at lower risk of AAP than housewives, a finding similar to Chatantiprapa *et al* from Thailand, and Koueta *et al*[15,18]. Petridou *et al* found the mother job was insignificant[12]. Inadequate supervision by housewife mothers, with hazardous home environment with unhealthy storage habits can explain this observation. In addition to that, working mother often keep their child in a selected environment (nursery) with a chosen supervisors. These finding also confirm the significance of adequate, an appropriate supervision and safe environment in reducing children risks of exposure to poisoning. As there is an increase in percentage of previous poisoning either in the child himself or -in higher %-in one of his siblings (Soori's study also revealed that those with previous poisoning at greater risk than others [19]), indicates that those children may be more active and mischievous by their parents[20] . But being repeated on other sibling previously alarms us for more investigations about the family traditions, habits, family structure and possible social problems in the

environment of poisoned child. Similar to Chatantiprapa *et al* 88% of poisoning accidents occur at morning (45% at morning and 43% at early afternoon), which is the time of their maximum activity. Also the home environment being the most hazardous place for young child that need to be concentrated on in planning for new educational programs.

Conclusions and Recommendations

Significant risk factors regarding younger age, larger family size, early day time occurrence and recurrence of accidents in the same family, in addition to improper storage places necessitate the advice for

- Earlier educational programs for adolescent females in their secondary school regarding poisoning hazards, bad habits of putting toxic substances in improper containers, beside putting them in improper places and near the child reaches
- Raise the problem of AAP in the primary health centers as part of educational program during pregnancy.
- More emphasis is needed to those families with repeated accidental poisoning for possible presence of child or family problems.

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