Determinants of Acute Poisoning among Children (1-60) months Old at a Poisoning Unit of a University Hospital, Egypt, are Employed Mothers a Risk Factor? Retrospective Cohort Study

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Abstract: Introduction: Childhood poisoning is a major cause of morbidity in the developing as well as the developed countries. In spite of the success of some interventions to prevent accidental poisoning in the pediatric population, toxic ingestions continue to be a common occurrence. Unintentional poisonings may occur as part of cognitive development in young children, less than 5 years who put almost anything into their mouths while discovering the environment. **Objectives:** The objectives of the present study were classified into: Ultimate Objective: To promote health among children up to 5 years. Immediate Objectives: To find out the incidence rate of poisoned children (1-60 months old) during the period of the study, to find out the common causes of poisoning among the studied children and to determine the risk factors of poisoning among the studied children. **Methods:** A retrospective cohort study was conducted in the period from July 2011 until May, 2012 at a poisoning unit of a university hospital. All studied children were from both rural and urban areas, boys and girls, not mentally retarded, age from 1 month old to 60 months old and of Egyptian nationality. All enrolled children were subjected to the following: Clinical assessment including general and local examinations, questionnaire including questions about demographic data, causes of poisoning, risk factors of poisoning, route and type of poisoning. **Results:** 18.5% of total admissions were children (1-60 months old), 62.5 % were males, 83.3% did not attend nursery, 79.9% were from urban areas, 33% of mothers were illiterate or read and write, 60.2% of cases were due to household products. Kerosene alone was implicated in (24.3%) of all cases, 47.4% cases were poisoned during the period from 8.00 am to <4 pm, 65.4% reached poisoning unit within 2 to < 4 hours of accidental poisoning, risk factors among the studied children were ordered by stepwise regression analysis as following; non employed mothers, children who did not attending nursery, male gender and education level of mothers (illiterate and read and write). **Conclusion:** Incidence rate of acute poisoning among children (1-60) months old was 18.5%, risk factors among the studied children were ordered by stepwise regression analysis as following; non employed mothers (housewives), children who did not attend nursery, male gender and education level of mothers (illiterate and read and write). **Recommendations:** continual health educational program for housewives and female workers.
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1. Introduction

Poisoning can be defined as taking, or being otherwise exposed to, a substance or substances injurious to health (1). Childhood poisoning is a major cause of morbidity in the developing as well as the developed world. In spite of the success of some interventions to prevent accidental poisoning in the pediatric population, toxic ingestions continue to be a common occurrence (2).

The pattern of incidence and the risk factors for children's acute poisoning change with time and differ from country to country, and even between geographical areas within the same country (3).

American survey revealed that, of the different external causes of unintentional injury death among children aged between 1 and 14 years, poisonings ranked fourth, after road traffic crashes, fires and drowning(4).

In Japan, the poison centers received 31510 enquiries in 2010 about poisoning in children under 6 years of age, 20% enquiries relating to children less than 1 year old made up 35.7% of these cases (5).

Data from 2009 from the American Association of Poison Control Centers showed that children less than 6 years old made up 50.9% of cases and 2.4% of the total reported fatalities and the most common poisonings among children were due to pharmaceutical products (6).

An estimated 86 000 childhood poisoning incidents were treated in US hospital emergency departments in 2008, amounting to 429.4 poisonings per 100 000 children (7).

Two studies have identified kerosene, petrol, medicines, insecticides, and household cleaning products as major hazards for poisoning incidents among young children (3&8).

Poisoning can have long term psychological and physical consequences for children and may result in large societal costs. In low and middle income countries, poisoning accounts for 10% of the total burden of unintentional injuries, and 6% of disability adjusted life years (9).

Unfortunately, much of the country information is from high-income countries. Some low-income and middle-income countries, though, have established poison control centers and begun to conduct research on poisonings (6).

Although there are educational programs and public campaigns designed to prevent children's acute poisoning, it continues to be a common medical emergency in the pediatric population (4).

Despite advances such as childproof caps on medications, childproof packaging, increased educational efforts, and increased awareness of commonly ingested substances, deaths due to unintentional poisonings still occur (7).

This study will try to identify the determinants of cases of acute poisoning among children (1-60 months old) who were admitted to Poisoning Unit of a university hospital in Egypt.

Objectives:

The objectives of the present study were classified into: Ultimate Objective: To promote health among children up to 5 years. Immediate Objectives: To find out the incidence rate of poisoned children (1-60 months old) during the period of the study, to find out the common causes of poisoning among the studied children and to determine the risk factors of poisoning among the studied children.

2. Subjects and Methods

Research setting: The present study was conducted in a Poisoning Unit at a University Hospital in Egypt. This unit of poisoning is the core centre for any poisoning case needs consultation all over the governorate in which the poisoning unit is situated.

Study design: A retrospective cohort study was conducted in the period from July 2011 until May, 2012. This study passed 3 phases; 3 months preparatory phase (during which site of the study, target population, preparation of interview sheet, pilot study, sampling and ethical consideration were done), 3 months implementation phase (during which data collection, diagnosis, treatment, and follow up till reaching outcome of the case) were conducted and 5 months evaluation phase (during which data entry, statistical analysis, results, discussion, conclusion and recommendations were formulated). Target population and Sampling: All children from both rural and urban areas who were admitted to the examined poisoning unit during the implementation

phase of the present study (3 months) were included in the present study. These children were from both rural and urban areas, boys and girls. Inclusion criteria were; not mentally retarded, age from 1 month old to 60 months old and of Egyptian nationality. Data Collection, statistical analysis and ethical consideration: Data collection was done by using an interview sheet (containing personal history, complaint, present history, past history, family history, general examination, local examination, investigations and final diagnosis). All care takers of the studied children were interviewed. Data entry and statistical analysis were done by using personal computer, Epi info program (3.2.2. version, CDC, USA). Proportion, mean ± St. D, chi square, Odds ratio and stepwise regression analysis were the statistical methods used in analysis of obtained data. P value < 0.05 was accepted as a level of significance.

All administrative approvals were taken from the administrative team of the hospital including the managing director and the head departments. All care takers of the examined children were subjected to a brief description on the aim of the study and oral consent was taken from them before subjecting their children to the present study. Methods: All enrolled children were subjected to the following: Clinical assessment including general and local examinations, questionnaire including questions about demographic data, causes of poisoning, risk factors of poisoning, route and type of poisoning. Clinical Assessment was including: General condition, AVPU which might be: Alert, Respond to verbal stimuli, Respond to painful stimuli, Unconscious. Respiratory rate, Temperature, Pulse, Blood pressure, Mouth (Ulcers and corrosions, and Cyanosis). Skin, Pupil, Chest, Signs of respiratory distress and C.N.S manifestation were recorded. Regular evaluation of the patient suspected of an overdose was essential for identifying new or developing findings or toxic syndromes, and for early identification and treatment of a deteriorating condition. This was done until the patient is completely recovered or considered no longer at risk for the consequences of a toxic exposure. Estimation of vital signs was recorded every 4 hours. All required investigations were done like E.C.G for cases with digitalis intoxication, Chest Radiograph (Routinely done to all cases with corrosive poisons , kerosene and other related petroleum distillates). Ultrasound and/or C.T. scan for selected cases, Arterial Blood Gases (Routinely done to all patients with household products, drugs and narcotics acute poisoning). Urea, Creatinine, transaminases, P.T, PTT, INR, CBC and Serum electrolyte for all cases admitted to ICU. Random Blood Glucose level (for

cases poisoned with overdose of ingested oral hypoglycemic drugs and also for all I.C.U patients). Serum Tegretol level (in Tegretol toxicity). Serum Digoxin concentration (in Digitalis toxicity). Serum Theophylline level (in theophylline toxicity). Viva color test (in cases of accidental ingestion of unknown drugs).

3. Results:

Table (1): shows that 273 (62.5 %) cases were males. 349 (79.9%) children were from urban areas. Majority of cases (83.3%) did not attend nursery. Mean of mothers' age was 28.03±4.4years. Majority of mothers 391 (89.5%) mothers were not working. Mean working hours among mothers was 6.08 ±0.4. As regards mothers' education; it was observed that 137 (31.4%) of mothers were graduated from secondary school. It was found that range of fathers' age was 19-53 years, mean was 34.36±6.2 years. Regarding fathers' status of employment; it was found that (96.1%) of fathers were working. Mean of working hours was among fathers was 7.2±2.05. As regards fathers' education; 152 (34.8%) of fathers were graduated from secondary school. It was shown that mothers were mostly the care takers of the studied children during the accident of poisoning (88.3%). Family type was simple in 381 cases (87.2%). The range of capita per family was 3-18 while the mean was 5.04 ± 2.27.

Table (2): shows that routes of poisoning were; oral in 434 (99.3%) cases, dermal in 2 (0.5%) cases, and respiratory in 1 (0.2%) case. Household products were shown to be the leading causative agents for acute poisoning in the present study. As regards types of poisons, it was recorded that 263 (60.2%) cases were due to household products, Kerosene alone was implicated in 106 (24.3%) cases, Cleaning products (chlorine, detergents) were the next common household products implicated in the present study, 64 (14.6%) cases were due to chlorine , 10 (2.3%) cases were due to detergents, and Pesticides accounted for 59 (19.5%) cases, Drugs were implicated in 102 (23.3%) cases, the most common drugs implicated in the present study were Anticonvulsants ingested by 14 (3.3%) cases, Analgesics were ingested by 12 (2.7%) cases, and Oral contraceptives were ingested by 10 (2.3%) cases, Food poisoning was implicated in 55 (12.6%) cases.

Table (3): shows that 18.5% (437 cases) of the total admitted cases (2358 cases) during the period of the study were children aged (1:60 months)

Table (4): shows that 207 (47.4%) cases were poisoned during the period from 8.00 am to 4 pm, 163 (37.3%) cases were poisoned during the period from 4.oo pm to 12.00 am, 67 (15.3%) cases were poisoned during the period from 12.00 am to 8.00 am.

Most of the studied patients, 286 (65.5%) cases reached the poisoning unit within 2 to 4 hours of accidental poisoning, 105 (24%) cases reached there within 4 to 6 hours, 32 (7.3%) cases reached there after more than 6 hours, and 14 (3.2%) cases reached there within less than 2 hours. 390 (89.2%) cases were poisoned in their parent's house, 31 (7.1%) cases were poisoned in other places, and 16 (3.7%) cases were poisoned in grandparents' house. It was found that 143 (37.4%) accidents of acute poisoning took place in the kitchen, 91 (23.8%) accidents took place in bedroom, 67 (17.5%) accidents took place in bathroom, and 78 (20.4%) accidents took place in other places. It was shown that 317 (72.5%) cases of poisoned children were affected from reachable sources while in 50 (11.4%) cases poison was not reachable. It was observed that (57.2%) of containers were locked, (42.8%) of containers were unlocked, and 45.1% of containers were not original, while 34.1% were original.

Table (5): shows that 239 (54.6%) cases were ill, 104 (23.8%) cases were healthy, 63 (14.4%) cases were drowsy, 20 (4.6%) cases were distressed, and 11 (2.6%) cases were comatose. As regards AVPU score; 363 (83.1%) cases were alert, 50 (11.4%) cases were responded to verbal stimuli, 13 (3%) cases were responded to painful stimuli, and 11 (2.5%) cases were unconscious. Concerning Respiratory rate; it was found that respiratory rate was normal in 414 (94.7%) cases, tachypnea in 22 (5%) cases, and bradypnea in only one (0.2%) case. It was found that pulse was normal in 437 (100%) cases. In accordance to temperature; it was normal in 416 (95.2%) cases while fever was reported in 21 (4.8%) cases. As regards blood pressure; it was recorded that blood pressure was normal in 432 (98.9%) cases, and hypotension was recorded in 5 (1.1%) cases. Mouth, was free in 381 (87.2%) cases, redness around mouth in 45 (10.3%) cases, and mouth ulcers, and corrosions in 11 (2.5%) cases. Skin was free in 434 (99.3%) cases, red in 2 (0.5%) cases, and cyanosed in 1 (0.2%) case. Pupil was reactive in 433 (99%) cases, and was pin point pupil in 4 (0.9%) cases. As regards signs of respiratory distress; it was found that grunting, acting alanasi, intercostal, subcostal retractions, and tachypnea, were absent in 417 (95.4%) cases, and present in 20 (4.6%) cases. Regarding C.N.S examination; it was free in 432 (98.8%) cases, convulsions was reported in 3 (0.7%) cases, and hallucinations in 2 (0.5%) cases.

Table (6): shows that gastric lavage was done for 164 (37.5%) cases. I.V. Fluids were given to 152 (34.8%) cases. 127 (29.1%) cases did not take any medicines while 125 (28.6%) cases were given H2 blocker, corticosteroid and 35 (8%) cases were given

H2 blocker, antiemetic, buscopan, and flagyl. 294 (67.3%) cases were discharged from hospital within less than 6 hours , 116 (26.5%) cases were discharged within 6 to 12 hours, and 27 (6.2%) cases were discharged after more than 12 hours. The majority of cases 424 (97%) recovered, while 13 (3%) of cases were referred to ICU then recovered, No child died during the study period.

Table(7): shows that out of 73 children attending nursery, 72 (98.6%) cases were poisoned through oral route, and 1 (1.4%) case was poisoned through respiratory route while out of 364 children not attending nursery, 362 (99.4%) cases were poisoned through oral route, and 2 (0.5%) cases were poisoned through dermal route. It was found that there was no statistical significance difference between both groups.

Table (8): shows that out of 46 cases of working mothers, poison was reachable for 37 (80.4%) cases, and not reachable in 9(19.6%) cases. It was noticed that out of 391 cases of not working mothers, poison was reachable in 350 (89.5%) cases, and not reachable in 41 (10.5%) cases. It was noticed that there was no statistical significance difference in both groups.

Table (9): shows that 32.6% of working mothers' children were poisoned during the period from 8 am-4 pm, 45.6% were poisoned during the period from 4 pm- 12 am, and 21.7% were poisoned during the period from 12 am- 8 am. It was noticed that 49.1% of non working mothers' children were poisoned during the period from 8 am-4 pm, 36.3% were poisoned during the period from 4 pm- 12 am, and 14.4% were poisoned during the period from 12 am- 8 am. It was found that there was statistical significance difference only in the group of consultation (8 am-<4pm)

Table (10): shows that 13% of working mothers' children was admitted to the poisoning Unit within less than 2 hours of exposure to acute poisoning, 73.9% were admitted within 2-4 hours, 6.5% were admitted within 4-6 hours, and 6.5% were admitted within more than 6 hours. It was recorded that 2% of non working mothers' children were admitted to hospital within less than 2 hours of exposure to acute poisoning, 64.4% were admitted within 2-4 hours, 26.1% were admitted within 4-6 hours, and 7.4% were admitted within more than 6 hours. It was found that there was statistical significance difference only in the group of consultation <2hours.

Table (11): shows that 52.2% of children from rural areas were poisoned by household products, 30.9% were poisoned by drugs, 10.2% were exposed to food poisoning, 1.1% was poisoned by narcotics, and 5.6% were poisoned by other types of poisons. It

was found that 62.2% of children from urban areas were poisoned by household products, 21.5% were poisoned by drugs, 13.2% were exposed to food poisoning, 0.2% was poisoned by narcotics, and 2.8% were poisoned by other types of poisons. It was found that there was no statistical significance difference in the group of oral route but it was found that there was only statistical significance difference in the group of oral route household residency with odds ratio 4 and 2.04 in the groups of narcotics and others respectively.

Table (12): shows that 15.2% of working mothers' children were poisoned at kitchen, 17.4% were poisoned at bathroom, 34.8% were poisoned at bedroom, 6.5% were poisoned at garden, and 32.6% were poisoned at other places. It was found that 34.8% of non working mothers children were poisoned at kitchen, 15.1% were poisoned at bathroom, 19.2% were poisoned at bedroom, and 16.1% were poisoned at others places. It was found that there was statistical significance difference only in the group of kitchen location.

Table (13): shows that 100% of cases of previously poisoned children were from families related to non working mothers.

Table (14): shows that 90% of cases of previously poisoned children were related to non working mothers, and 10% of cases of previously poisoned children were related to working mothers.

Table(15): shows that by using stepwise regression analysis; it was found that the order of the risk factors of acute poisoning among the studied children were as following; children to mothers who were not employed (housewives), children who were not attending nursery, male gender, and lastly the education level of the mothers (illiterate and only read and write).

4. Discussion

Acute poisoning is one of the important causes of emergency unit admissions. Identification and documentation of epidemiological aspects and other variables in childhood poisoning are of great importance for determination of proper preventive measures. In the present study, acute poisoning accounted for 18.5% of the cases admitted to the examined toxicology unit (Table 3). Andiran and Sarikayalar found that in 489 poisoning cases poisonings <10 years of age were more frequent in males whereas poisonings >10 years of age were more common in females (12). In several studies, it has been reported that 51.4%-73.3% of all poisoning cases observed in Turkey involved children <5 years of age (10-13).

It was observed that in developed countries, the percentage of pediatric emergency service admission

for poisoning was 0.28% to 0.66% (8, 15). According to these findings; it is postulated that poisonings are still an important issue in Egypt (very low proportion in developed countries when compared to the proportion of the present study).

Table (1): General characteristics of the studied children

General characteristics	Total N.=437	
	N.	%
Gender		
Male	273	62.5
Female	164	37.5
Age of the child (months)		
Range : 1 - 60		
Mean ± St.D: 29.5 ± 12.2		
Residency		
Rural	88	20.1
Urban	349	79.9
Child education-Attending nursery	73	16.7
Mother's age (years)		
Range: 17-44		
Mean± St.D: 28.03 ±4.4		
Employment status of mothers		
Working	46	10.5
Working hours of employed mothers(hours/day) (Total N.=46)		
Range: 6 - 8		
Mean ±St.D: 6.08:± 0.4		
Educational level of mothers		
Illiterate	90	20.6
Read and write	54	12.4
1ry school	39	8.9
Prep school	36	8.2
Secondary school	137	31.4
University	81	18.5
Age of fathers (years)		
Range:19-53		
Mean± St.D: 34.4± 6.2		
Employment status of fathers		
Working	420	96.1
Working hours of the fathers (hours/day)		
Range: 6-12		
Mean± St.D:7.2 ± 2.05		
Educational level of fathers		
Illiterate	61	14
Read and write	75	17.2
1ry school	20	4.6
Prep school	35	8
Secondary school	152	34.7
University	94	21.5
Care-taker during accident		
Mother	386	88.3
Others	51	11.7
Family type		
Simple	381	87.2
Compound	56	12.8
Number of capita per family		
Range:3-18		
Mean± St.D: 5.04±2.2		

Table (2A): Route and type of poisons among the studied children.

Route and types	Total N.=437	
	N.	%
Route of exposure to poison		
Oral	434	99.3
Dermal	2	0.5
Respiratory	1	0.2
Type of poisoning		
Food poisoning	*55*	*12.6*
Household product	*263*	*60.2*
- Kerosene	106	24.3
- Cleaning products	74	16.9
Chlorine	64	14.6
Detergents	10	2.3
- Pesticides	59	19.5
Insecticides	52	11.9
Rodenticides	7	1.6
- Caustic potash	9	2.1
- Disinfectants	8	1.8
Phenol	5	1.1
Savlon	2	0.5
Dettol	1	0.2
- Hair dye	2	0.5
-Acetone	1	0.2
-Hair oil	1	0.2
-Wall paint	1	0.2
-Shoe-shiner	1	0.2
-Car-air freshener	1	0.2

Table (2B): Types of poisons among the studied children

Types of poisons	Total N.437	
	N.	%
Drugs	*102*	*23.3*
-Antiepileptic	15	3.5
Tegretol tab	13	3
Apytril tab	1	0.2
Epilogue tab	1	0.2
-Analgesics	12	2.7
Tramadol tab	6	1.4
Aspocid tab	4	0.9
Voltaren supp	1	0.2
Paramol syrup	1	0.2
-Oral contraceptive pills	10	2.3
-Cough medication	6	1.4
Aminophylline syrup	3	0.7
Ventoline syrup	1	0.2
Expectorant syrup	1	0.2
Guava syrup	1	0.2
-Antihypertensive tab	7	1.6
-Digoxin tab	5	1.1
-Oral hypoglycemic tab	5	1.1
-Unknown drug	5	1.1
-Antibiotic	4	0.9
-Antidepressants	4	0.9
-Sedatives and hypnotics	3	0.7
-Topical antiparasitic agents (Licid)	3	0.7
-Thyroid medication	2	0.5

Table (2C): Types of poisons among the studied children

Types of poisons	Total N.437	
	N.	%
-Anti histaminic	2	0.5
-Combination of hypoglycemic & antihypertensive	2	0.5
-Urine disinfectant	2	0.5
-Calcium tablets	2	0.5
-Skin lotions	2	0.5
-Anti protozoal(flagyl syrup)	2	0.5
-Muscle relaxant(mylostan tab)	1	0.2
-Anti psychotic	1	0.2
-Anti hyperlipidemic	1	0.2
-Multivitamin	1	0.2
-Vaginal wash	1	0.2
-Brain stimulant (oxybral tab)	1	0.2
-Nocturnal enuresis treatment (uriban tab)	1	0.2
-Bromocreptin tablets (parlodel tab)	1	0.2
-Anti parkinsonism medication	1	0.2
Narcotics (Cannabis)	*2*	*0.4*

Table (2D): types of poisons among the studied children

Types of poisons	Total N.=437	
	N.	%
Others	*15*	*3.5*
- Unknown substance	7	1.6
-Snake bite	2	0.5
-Mercury	2	0.5
-Castor seed	2	0.5
-Oil ward	1	0.2
-Wine	1	0.2

Table (3): Incidence rate of acute poisoning in the studied children

Age group	Total admitted cases (Total number= 2358)	
	Number of cases	%
1 – 60 months	437	18.5
> 60 months	1921	81.5
Total admitted cases	2358	100.0

Table (4): Time, place, location, availability and container of poisons among the studied children.

Time, place, location, availability and container of poison	Total N.=437	
	N.	%
Time of exposure		
8.00 am – <4.00 pm	207	47.4
4.00 pm – <12.00 am	163	37.3
12.00 am – 8.00 am	67	15.3
Time of consultation		
Less than 2 hours	14	3.2
2 – 4 hours	286	65.5
4 – 6 hours	105	24
More than 6 hours	32	7.3
Place of poisoning		
Parent's house	390	89.2
Grandparent's house	16	3.7
Others	31	7.1
Location of poisoning (cases other than food poisoning : total number = 382)		
Kitchen	143	37.4
Bedroom	91	23.8
Bathroom	67	17.5
Garden	3	0.8
Others (living room, dining room, balcony and unknown place)	78	20.4
Reach ability of poison		
Reachable (At a height of 150 centimeter from floor)	317	72.5
Not reachable (At a height above 150 centimeter from floor)	0	11.4
Others: Cases of food poisoning, snake bite, unknown sources, inhalation of poisons, unintentional overdose of drugs.	70	16.1
Type of containers		
No container	91	20.8
Original	149	34.1
Not original	197	45.1
Status of observed containers (Total N.=346)		
Locked	198	57.2
Unlocked	148	42.8

Table (5): Clinical examinations of the studied children

Clinical Examinations	Total N.=437	
	N.	%
General condition		
Healthy	104	23.8
Ill	239	54.6
Distressed	20	4.6
Drowsy	63	14.4
Comatose	11	2.6
AVPU		
A:Alert	363	83.1
V:Respond to verbal stimuli	50	11.4
P:Respond to painful stimuli	13	3
U:Unconscious	11	2.5
Respiratory rate		
Normal	414	94.7
Tachypnea	22	5.1
Bradypnea (respiratory rate less than 20)	1	0.2
Pulse		
Normal	437	100
Abnormal	0	0
Temperature		
Normal	416	95.2
Fever(>37.5)	21	4.8
Blood pressure		
Normal	432	98.9
Hypotension	5	1.1
Mouth		
Ulcers and corrosions	11	2.5
Nothing	381	87.2
Redness around mouth	45	10.3
Skin		
Free	434	99.3
Red	2	0.5
Cyanosis	1	0.2
Pupil		
reactive	433	99.1
pin point pupil	4	0.9
Signs of respiratory distress		
Yes	20	4.6
No	417	95.4
Central nervous system		
Free	432	98.8
Convulsions	3	0.7
Hallucinations	2	0.5

Table (6): Modalities of treatment, periods of staying and outcome among the studied children

Modalities of treatment, periods of staying and outcome	Total N.=437	
	N.	%
Gastric lavage, and Powdered Activated Charcoal		
Yes	164	37.5
No	273	62.5
I.V fluids (pediament, pansol, ringer, saline and glucose)		
Yes	152	34.8
No	285	65.2
Hospital stay		
< 6 hours	294	67.3
6 – 12 hours	116	26.5
>12 hours- 72 hours	27	6.2
Outcome		
Recovered	424	97
Referred to I.C.U then recovered	13	3

Table (7): Distribution of route of poison according to child education

Child education	Route of poison					
	Oral		Dermal		Respiratory	
	N.	%	N.	%	N.	%
Nursery (Total N.=73)	72	98.6	0	0	1	1.4
At home (Total N.=364)	362	99.4	2	0.5	0	0
Chi2	0.6					
P value	0.4					

Table (8): Distribution of reach ability of poison according to employment status of mothers

Employment status	Reach ability of poison			
	Reachable		Not reachable	
	N.	%	N.	%
Employed (Total N.=46)	37	80.4	9	19.6
Not employed (Total N.=391)	350	89.5	41	10.5
Chi2	3.3		3.3	
P value	0.06 (insig.)		0.06 (insig.)	
Odds ratio	2.1		2.1	

Table (9): Distribution of time of exposure according to employment status of mothers

Employment status of mothers	Time of exposure					
	8 am-<4 pm		4 pm-<12 am		12 am-8 am	
	N.	%	N.	%	N.	%
Employed (Total N.=46)	15	32.6	21	45.6	10	21.7
Not employed (Total N.=391)	192	49.1	142	36.3	57	14.5
Chi2 P value Odds ratio	4.5 0.03 (sig.) 0.5		1.5 0.2 (insig.) 1.5		1.6 0.2 (insig.) 1.6	

Table (10): Distribution of time of consultation according to employment status of mothers

Employment status of mothers	Time of consultation							
	<2 hours		2-<4 hours		4-6 hours		>6 hours	
	N.	%	N.	%	N.	%	N.	%
Employed (Total N.=46)	6	13	34	73.9	3	6.5	3	6.5
Not employed (Total N.=391)	8	2	252	64.4	102	26.1	29	7.4
Chi2 P value Odds ratio	16.05 0.00006(sig) 7.2		1.6 0.2 (insig.) 1.6		8.6 0.003(sig) 0.2		0.05 0.3(insig.) 0.8	

Table (11): Distribution of type of poison according to residency

Residency	Type of poison									
	Household		Drugs		Food poison		Narcotics		Others	
	N.	%	N.	%	N.	%	N.	%	N.	%
Rural (Total N.=88)	46	52.2	27	30.9	9	10.2	1	1.1	5	5.6
Urban (Total N.=349)	217	62.2	75	21.5	46	13.2	1	0.2	10	2.8
Chi2 P value Odds ratio	2.9 0.003(sig) 0.7		3.3 0.06(insig) 1.6		0.6 0.4(insig) 0.7		1.1 0.3(insig) 4.0		1.7 0.2(insig) 2.04	

Table (12): Distribution of location of poison according to employment status of mothers

Employment status of mothers	Location of poison									
	kitchen		Bathroom		Bedroom		Garden		Others	
	N.	%	N.	%	N.	%	N.	%	N.	%
Employed (Total N.=46)	7	15.2	8	17.4	16	34.8	3	6.5	15	32.6
Not employed (Total N.=391)	136	34.8	59	15.1	75	19.2	0	0	63	16.1
Chi2 P value Odds ratio	21.8 0.0(sig) 0.2		0.06 0.8(insig) 0.9		2.4 0.1(insig) 1.7				3.6 0.06(insig) 1.9	

Table (13): Distribution of past history of poisoned children according to employment status of mothers

Employment status of mothers	Past history of poisoned children	
	N.	%
Employed (Total N.=0)	0	0
Not employed (Total N.=7)	7	100

Table (14): Distribution of family history of poisoned child according to employment status of mothers

Employment status of mothers	Family history of poisoned child	
	N.	%
Employed (Total N.=1)	1	10
Not employed (Total N.=9)	9	90

Table (15): Stepwise regression analysis of risk factors of acute poisoning among the studied children

Risk factors	B-Coefficient	Partial F test
Not employed mothers (housewives)	-0.0053	2.9
Children not attending nursery	-0.0094	1.8
Male gender	-0.0032	1.5
Illiterate and only read and write mothers	-0.0015	1.2

It was observed in the present study that male predominance (62.5 %) was found among the studied cases (Table 1) and this also was observed in Pakistan's study and in Kuwait's study (1, 14). This could explained as males are more active than females, less obeying to orders, less intelligent, more curious to explore world around them.

Ozdogan *et al.,* found that the highest incidence of poisoning was in age group 13 months to 4 years (13). In this age group, putting small foreign objects like drugs into mouth by children can cause poisoning. As in the literature, the present study revealed that (99.3%) of the studied cases were poisoned through the route of oral ingestion (Table 2A). Also, it was found in the present study that 23.3% of all poisonings were due to drugs (Table 2B). This may be due to placing the drug in easily accessible places as seen in table (4), 72.5% of the studied cases found the poison in reachable places (less than 150cm from floor) .

It was found in the present study that 24.3% of the studied cases were poisoned from kerosene (Table 2A). Kerosene oil is the commonest hazardous substance ingested accidentally by children living in Third World countries like Pakistan, India (16) and Sri Lanka (17). This could be explained that Kerosene is ingested accidentally by children due to their inquisitive behavior. Surprisingly, in this era of development and technology, kerosene poisoning cases are reported from industrialized cities (3). The toxic effects on the body are due to its chemical properties of being more aromatic, having lower viscosity and surface tension. It was reported in an Iraqi study that hydrocarbons mainly kerosene constitute the most common poisoning (96 case 56.2%) followed by drugs then insecticide, household products, CO poisoning, rat killer in children below 5 years (18). Other studies have found that Kerosene is implicated as a major cause of Acute poisoning among children below 5 years in Kuwait, Ahwaz, Vienna and New Delhi (19-23). This result was not seen in United Arab Emirates, Oman, Turkey, and Greece where drugs was implicated as the major cause (24-27). . This could be referred to changing in habits, changing in life styles, beside improvement in

the socioeconomic state. Also the type of drug reflects the common drugs used in each community.

In the present study, it was noted that the urban environment is more hazardous (table 1&11). This could be explained by the more availability and use of poisonous substances in urban areas more than rural areas.

It was found in the present study than mean number of capita per the studied families was 5.04 (Table 1). This agrees with literatures like Azizi *et al.,* from Malaysia who reported that living in a household with more than 5 occupants is a significant risk factor (28), and also so reported Ozdogan *et al.,* (13).

It was reported in the present study that mean age of the mothers of the affected children was 28.03 years (table 1) and this agree with study which have conducted in Baghdad which found that most accidental poisoning cases was belong to mothers aged 25-35 years (18).

In the present study; Children of working mothers were at lower risk of poisoning than housewives (table 1, 8, 9, 15). This finding is in the same line with Chatantiprapa *et al.,* from Thailand, and Koueta *et al.,* [30, 31]. Also, Petridou *et al.,* found the mother job was insignificant (27). This could be explained by the inadequate supervision by housewife mothers and hazardous home environment with unhealthy storage habits. In addition to that, working mother often keep their child in a selected environment (nursery) with a chosen supervisors and this was a clear finding in the present study as majority of the poisoned children were not attending Nursery (Table 1). These finding confirm the significance of adequate, an appropriate supervision and safe environment in reducing children risks of exposure to poisoning. Also, the amount of time isn't as important as what she brings to the relationship with the child. On average, these employed mothers are working for about 6 hours per day a week (Table 1), but it could be postulated that they spend more time with their children on days off, and less time on household chores, leisure and other activities so they can arrange for staying poisons away from reaching by children (table 8,12). Another confirming finding which was found in the present study is that out of the cases with past history of acute poisoning, there was no any case linked to the children of the employed mothers (Table 13). Also these findings were supported with another finding in the present study which noticed that majority (90%) of the cases with family history were linked to non employed mothers (Table 14).

In the present study, the highest frequency of cases of poisoning was noticed at 8.00 am - <4.00 pm followed by 4.00 pm – <12.00 am (Table 4). This

confirm that work of mothers is not a direct cause of the accidents of poisoning among the studied children as that time of the accidents is considered the time of the presence of non employed mothers at homes especially the present study revealed that 89.5% of the admitted cases were to non employed mothers (table 1, 9). This agrees with study conducted in Baghdad which stated that; the highest frequency of poisoned cases was noticed at 8.00 am - 12.00 noon followed by 12.00 noon – 4.00 pm (18).

It was found in the present study that the majority of cases who were admitted to the poisoning unit were; alert (83.1%), normal respiratory rate (94.7%), all of them were with normal pulse rate, normal temperature (95.2%), normal blood pressure (98.9%), normal mouth (87.2%), normal skin (99.35), reactive pupils (99.1%) and no neurological manifestations (98.8%) (Table 5). Also it was found in the present study that 424 (97%) cases were recovered, while 13 (3%) of cases were referred to ICU then recovered and no child died during the period of the study (table 6). This could be attributed to that acute poisoning among the studied children was unintentional (not suicidal), the amount had taken by the child usually small, and toddlers usually present for evaluation within 2-4 hours (table 4).

Conclusion:
Incidence rate of acute poisoning among children (1-60) months old was 18.5%, a male predominance was noticed (62.5 %), majority of cases (83.3%) did not attend nursery, majority of mothers (89.5%) were housewives. (60.2%) of cases were due to household products, Kerosene alone was implicated in (24.3%) of all cases. (37.4%) of cases took place in the kitchen. No mortality was reported. Risk factors among the studied children were ordered by stepwise regression analysis as following; non employed mothers (housewives), children who not attending nursery, male gender and educational level (illiterate and read and write) of mothers.

Recommendations:
earlier health educational programs for adolescent females in their secondary school regarding poisoning hazards, Arising the problem of acute poisoning in the primary health care centers as a part of health educational program during pregnancy and continual health educational program for employed mothers on routes, types and appropriate storage of poisons at homes.

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