

Effect of Guiding Program on Mothers' Health Awareness Regarding Household Poisoning of their Children Less Than Six Years Old in Rural Areas.

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Abstract: Background: Household poisoning refers to the exposure to poisonous substances that can be products in the house. Poisoning is one of the leading causes of injury to children. Most poisonings happen in a child's home, especially with a child under six years old. Young children are particularly susceptible to the ingestion of poisons, especially liquids, because they are very inquisitive, put most items in their mouths and are unaware of consequences. Children are often poisoned by common household chemicals, cleaners and medicines. **The aim:** this study aimed to explore the effect of a guiding program on mothers' health awareness regarding household poisoning of their children less than six years old. **Design:** A quasi-experimental study was utilized. **Setting:** The study was conducted in Maternal and Child Health Center in Moshtohour village, Qalyubia governorate and the Outpatient Clinic of Children' Hospital affiliated to Ain Shams University Hospitals. **Sample:** A purposive sample composed of 50 mothers and their children were included in this study. **Tools:** **I. Pre-designed Questionnaire Format by Interviewing;** to assess demographic characteristics of the studied mothers & their children and to assess mothers' knowledge regarding household poisoning. **II. An Observation Checklist, it consisted of two parts: A) Poisoning Prevention Checklist,** to assess mothers' reported practices regarding preventive measures of household poisoning. **B) First Aid Poisoning Checklist,** to assess mothers' reported practices regarding first aid of household poisoning. **Results** of the study revealed that, after application of the guiding program and booklets dissemination, the studied mothers showed significant improvement in their health awareness regarding household poisoning of their children less than six years old. **Conclusion:** Application of the guiding program has a positive effect on the studied mothers' knowledge and reported practices regarding household poisoning of their children less than six years old. This study **recommended** that, guiding programs for household poisoning prevention should be applied in all pediatric health care settings. Guiding instructions through mass media should be directed to prevent and control household poisoning among children.

Key words: Mothers, Health, Awareness, Children, Household, Poisoning, Prevention, First aid, Nursing.

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I. Introduction

Poisoning refers to an injury that results from being exposed to an exogenous substance that causes cellular injury or death. Poisons can be inhaled, ingested, injected or absorbed. The exposure may be acute or chronic and the clinical presentation will vary accordingly. The factors determining the severity of poisoning and its outcome in a child are interrelated and including the type of poison, the dose, the route of exposure, the age of the child, the presence of other poisons, the state of nutrition of the child and the presence of other diseases or injuries (WHO, 2008). Accidents in childhood can lead from temporary disability to death. Accidents have epidemiological causes and determinants that can be prevented and controlled and are usually the result of a set of factors that make their occurrence predictable (Nascimento et al., 2016).

Childhood poisoning is a leading cause to morbidity and mortality in both developing and developed countries. In spite of the success of some interventions to prevent accidental poisoning among children, it continues to be a common occurrence. Poisoning can be defined as being exposed to ingestion, inhalation, injection or absorption of a substance which is harmful to the child's health. Poisoning in preschool children is mainly unintentional and commonly due to non-pharmaceutical agents (Alazab et al., 2012).

The home and its surroundings can be dangerous places for children, particularly for the possibility of unintentional poisoning. Children are naturally curious, exploring in and around the home. As a result, each year millions of calls are made to poison control centers (also called poison information centers). Thousands of children are admitted to emergency departments because they have inadvertently consumed some type of household product, medicine or pesticide. Most of these "accidental" poisonings could have been prevented (WHO, 2008).

More than 90% of all poisonings occur within the home environment and many common household products can be poisoning to children. Most poisoning accidents involve Over-the-counter preparations (medicines). Household products (bleach, disinfectants, detergents, cleaning agents, vinegar, kerosene and cosmetics). Pesticides were the most frequent agents leading to morbidity and mortality. Batteries which can be found in watches, calculators and remote controls, Children may swallow small batteries containing alkaline chemicals (*WHO, 2004*). Common poisoning agents in high-income countries include pharmaceuticals, household products (e.g. bleach, cleaning agents), pesticides, poisonous plants and bites from insects and animals. Common poisoning agents in low-income and middle income countries are fuels such as paraffin and kerosene, pharmaceuticals and cleaning agents (*Ahmed et al., 2015*).

Young children are mostly prone to the consumption of poisonous substances, especially liquids, because they are very curious and therefore may end up putting most items in their mouths even though they are unaware of consequences (*Persephone et al., 2015*). Most poisonous substances involve medicines, household products and cosmetics. Some poisonous substances can cause breathing difficulties; for instance, under-the-sink cupboards which contain potentially dangerous cleaning products. These substances to a child appear like brightly colored sweets despite being toxic. It is noticed that there is an increasing number of children who have accidentally swallow these substances in recent years (*Sackitey, 2018*).

Pediatric poisoning represents a major and preventable cause of morbidity and mortality throughout the world. Poisoning is common among (1-5) years old children, they are particularly vulnerable to accidents and poisoning because of their curiosity nature and willingness to learn and being less able to control themselves than other ages. Also the children cannot distinguish possible harmful substances and hazardous situations so the substances they found can be taken by mouth which may lead to poisoning (*Azab et al., 2016*).

In 16 high-income and middle-income countries, poisoning is the fourth biggest cause of unintentional injury after road traffic injuries, fires and drowning. Fatal poisoning rates in low-income and middle-income countries are four times that of high-income countries (*Ahmed et al., 2015*). The prevalence and types of poisoning vary in different parts of the world. They depend on industrial development, agricultural activities, and cultural practices relating to supervision of children, local beliefs and customs. According to the World Health Organization (WHO), acute poisoning accounts for an estimated 45,000 deaths annually among children and youth under the age of 20 years (*Alazab et al., 2012*).

In 2012 in the United States, there were more than 1.4 million poisoning in children and adolescents. The youngest are most at risk; approximately 50% of all poisoning occur in children under the age of 6 years (*WHO, 2008*). The epidemiology of pediatric poisoning differs by country. Children are influenced by the prevalent social, occupational, economic, and cultural practices as well as the availability of specific poisons. In high and middle-income countries, the rate of fatal poisoning is the highest for children under one year. (*Azab et al, 2016*).

Poisoning can be reduced through the use of effective prevention strategies; removing the poisoning agent from the environment (e.g. removal of poisonous plants, removal of fuel sources such as bottled kerosene); replacing the poisoning agent with one of lower toxicity (e.g. replacing aspirin with paracetamol, reformulating methylated spirits to include ethyl alcohol rather than methanol). Legislation (and enforcement) of child-resistant packaging of necessary poisonous agents (e.g. medicines, household chemicals and other toxins). Reducing toxicity of poisoning agents by packaging in non-lethal concentrations or doses. Establishing a poison control center to triage poisonings, dispensing accurate and timely advice to caregivers and health facilities, directing first aid where appropriate, and referring more severe poisonings to treatment at a health facility (*WHO, 2008*).

Significance of the study:

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 (*Alazab et al., 2012*). According to Ain Shams University's Poisoning Treatment Center (ASU-PTC), (2009-2013), data from electronic records maintained, reported (19, 987) were younger than 6 years of age during the 5-years period.

II. Subjects & methods

A. Research design and aim of the study.

quasi-experimental study design was used to explore the effect of guiding program on mothers' health awareness regarding household poisoning of their children under six years old.

B. Research Hypothesis.

The current study hypothesized that; the application of guiding program will be associated with a positive effect on mothers' health awareness regarding household poisoning of their children less than six years old.

C. Research Settings.

The study was conducted at Maternal and Child Health Center in Qalyubia governorate in Moshtohour village and Outpatient Clinic of Children' Hospital affiliated to Ain Shams University Hospitals. These settings are providing child health care services for the high flow rate of children less than 6 years old who are seeking health services. Teaching sessions were conducted in specialized room at the previously mentioned settings.

D. Research Subjects.

Sample Size and Characteristics: A purposive sample composed of 50 mothers and their children (25 cases from Maternal and Child Health Center and 25 from Outpatient Clinic of Children' Hospital) were chosen from the previously mentioned settings according to the following inclusive criteria:

- Mothers who have children less than six years.
- Mothers who have children from both genders.
- Mothers who are living in rural areas.
- Mothers who were available at the time of data collection.

Tools of data collection

Data were collected through using the following tools:

I. Pre-designed Questionnaire Format by Interviewing:

It was designed by the researchers based on updated related literatures to assess demographic characteristics for mothers and their children and mothers' knowledge regarding household poisoning of children under six years, it consisted of two parts:

Part 1: Characteristics of the studied subjects. It included characteristics of the studied mothers such as age, level of education and occupation. Characteristics of the studied children such as; age, gender, previous exposure to household poisoning and type of poisoning.

Part 2: Questions regarding household poisoning of children less than 6 years. It was modified from *Sethi et al., (2008)*, it involved: Definition, types, causes, routes, clinical pictures, first aid and prevention of household poisoning of children less than 6 years. Mothers were interviewed individually or in groups that entail 3-5 mothers according to their readiness and the questionnaire format were filled in by the educated mothers and by the researchers for illiterate mothers. According to the answers obtained from the mothers, a scoring system was followed to evaluate the mothers' level of knowledge regarding household poisoning of children less than 6 years old. The total score for the questionnaire was 21 grades (equal 100%). The studied mothers' answers were checked using a model key answer and accordingly, their knowledge were categorized into; correct knowledge (scored 60% and more), and incorrect knowledge (scored less than 60%).

II An Observation Checklist, it consisted of two parts:

A) Household Poisoning Prevention Checklist

It was adopted and modified from *Home Safety Council (2015)*. It was used to assess mothers' reported practices as regards household poisoning prevention in the kitchen, in bathroom and in storage area. Time consumed for assessing each checklist took 5-10 minutes. For Scoring, score (1) was given for each step done correctly and score (0) was given for each step done incorrectly or not done. The total number of checklists was 3, each checklist scored from seven to eight grades according to total number of steps. For each procedure that made a total score of 23 grades (equal 100%) for all procedures. Accordingly, the scoring system of mothers' reported practices was classified into either satisfactory done (more than 60%) or unsatisfactory done (less than 60%).

B) First Aid Poisoning Checklist

It was adopted from *Queensland Poisons Information Centre (2016)*. It was used to assess mothers' reported practices as regards first aid for household poisoning of their children less than 6 years. It composed of five parts to assess mothers' reported practices regarding first aid for poisoning by ingestion (through the mouth), through the eyes, inhalation (by breathing in), absorption (through the skin), through contact with poisonous sprays, pesticide, and insecticides and injection into the skin as the result of bites from some animals or insects. For scoring, the total number of checklists was 5. Each check list scored from six to eight grades according to total number of steps. A score (1) was given for each step done correctly and a score (0) was given for each step done incorrectly or not done. For each procedure that made a total score of 32 grades (equal 100%) for all procedures. Accordingly, the scoring system of mothers' actual practices was classified into either satisfactory done (60% or more=19 or more) or unsatisfactory done (less than 60%= less than 19).

Content validity:

It was tested through five experts from the staff of Faculty of Nursing, Pediatric and Community Health Nursing Department, Ain Shams University.

Administrative and Ethical Design:

After explanation of purpose of the study, an official permission was granted by submission of formal letter issued from the administrators of Faculty of Nursing, Ain Shams University to the administrators of the previously mentioned settings. Also, a copy of study tools was given to them before data collection.

Ethical consideration:

An official permission was obtained. A clear and simple clarification about the aims and nature of the study was explained to all participant mothers. Consent was obtained from the selected mothers to ensure willingness to engage in the study. Mothers' participation was voluntary; they can withdraw from the study at any time. The researchers ensured confidentiality of the participant mothers' personal data and the study hasn't any harmful effect on them.

Operational design:

A. Pilot Study

A pilot study was carried out for the purpose of testing the tools, to determine clarity, applicability, objectivity and feasibility of the study. To achieve that, the tools were tested over 5 mothers (10% of the study sample). Content validity was reviewed and determined by a panel of five expert professors in pediatric and community health nursing specialty. After testing tools modifications were done to develop final form of study tools. Results obtained from the pilot study were not included in the main study results. Data were collected for all mothers who met the study criteria.

B. Field work

- Actual field work was carried out in the period from the beginning January 2016 up to the end of June 2016, in the previously mentioned settings.
- Informed consent was secured before collecting data.
- For work organization, the researchers allocated 2 days each week (Tuesday and Thursday), from 9 AM – 12 PM, 3 - 5 mothers / day, for collection of data from mothers at the selected study settings.
- The assessment phase (pretest) was done for 50 mothers and posttest done after program implementation within one month.

Guiding program construction:

The current study was carried out on four phases, preparatory, assessment implementation and evaluation phase.

First: Preparatory phase:

Based on the results obtained from the pilot study, the guiding program was designed by the researchers also, it was revised and modified according to the related recent, national and international literature, the various aspects of the research problem were taken into the considerations.

Second: Assessment phase:

In this phase, the researchers collecting the following data:

A structured interviewing questionnaire for the selected mothers having less than 6 years old child consisted of:

- Assessment of the mother's socio demographic data.
- Assessment of mother's knowledge regarding the household poisoning of their children less than 6 years old (pre & post the guiding program): it was modified from *Sethi et al., (2008)*.
- Assessment of mothers' reported practices (pre & post the guiding program) through asking questions; it was adopted and modified from **Home Safety Council (2015),and Queensland Poisons Information Centre (2016)**.

Third: Guiding program development and implementation phase:

Program implementation based on conducting session plans using different educational methods, and media in addition to the use of a guiding booklet specifically designed and developed based on mothers assessment needs.

Program sessions

- The program was implemented over a period of 6 months; time allowed 7 hours distributed on 7 sessions: 2:45 hours for theory and 4:15hours for practices. The duration of each session was ranged from 35 minutes to 45 minutes.
- The actual work started by meeting the mothers in the previously mentioned settings, first, each researcher introduced herself to the mothers and gave them a brief idea about the study and its aim.
- At the beginning of the first session, an orientation was done about the program, its purposes, and the mothers were informed about the time of program sessions.
- Each session started by a summary about what was given through the previous sessions and objectives of the new one, taking into consideration using simple and clear language to all levels of the studied mothers.

Teaching methods

Lectures, demonstration and re-demonstration, and group discussion.

Media

Suitable teaching aids prepared especially for the program were used such as, printed materials, posters, the guiding booklet and power point presentation & videos using laptop.

Guiding Program Booklet

A booklet was constructed for mothers according to their educational level and needs. It was prepared in simple Arabic language. It was aimed to improve mothers' health awareness regarding household poisoning of their children less than six years old.

Fourth: Program evaluation phase:

Evaluation was applied before and after the program through pre and posttest using the same study questionnaire, in order to appraise differences, similarities and areas of improvement, as well as defects and estimate the effect of guiding program on mothers' health awareness regarding household poisoning of their children less than six years old.

Statistical design:

Data were collected, organized, revised, coded, tabulated and analyzed by using the Statistical Package for Social Science (IBM SPSS) version 20.

The following statistical techniques were used:

Numbers, percentages, mean value, standard deviation ($\bar{X} \pm SD$), chi-square (χ^2), paired t test and proportion probability (p-value).

Significance of results

- When $P > 0.05$ it is statistically insignificant difference.
- When $P < 0.05$ it is statistically significant difference.
- When $P < 0.01$ or $P < 0.001$ it is high significant difference.

III. Results

Table (1) shows that, more than one third (34 %) of mothers' age ranged from 25- < 30 years with $\pm SD = 33.5 \pm 2.9$. Regarding mothers' level of education, more than half (54%) of them were secondary educated compared to 4 % of them were illiterate. Also, the majority (90 %) of them were housewives. As regards the sources of the studied mothers' knowledge about household poisoning among the children less than 6 years, figure (1) shows that, more than two fifths (46%) of the studied mothers get their knowledge from parents and relatives while the minority of them (4%) get their knowledge through mass media.

Concerning the age of the studied children, table (2) shows that, more than half (58%) of the studied mothers having one child less than 6 years old and two fifths (40%) of them having two children. More than half (55.6%) of the studied children were males. Also, more than one fifth (22%) of the studied children are previously exposed to household poisoning and nearly one half (45.4%) of them are exposed to cleansing agent poisoning. Meanwhile, more than quarter (27.3%) of them is exposed to poisoning with medication.

In relation to mothers' correct knowledge regarding household poisoning among their children less than 6 years old, it is clear from table (3) that, most [96%, 90% and 94%] of the studied mothers their knowledge were correct after the program regarding definition, risk factors and prevention of household poisoning respectively compared to 66%, 56%, 64% before the program that reflects statistical significant difference ($\chi^2 = 18.9$ with $p < .05$) pre and post the program. Regarding total score of mothers' knowledge, figure (2) shows that, total score of correct studied mothers' knowledge was 94% after program implementation compared to 38 % before the program with statistical significant difference ($\chi^2 = 29.8$, $P = < .05$).

As revealed from table (4), there is a clear improvement in mothers' reported practices regarding all items of household poisoning prevention measures in the kitchen post program compared to the minority before the program with highly statistical significant difference (t test = -10.93, $p < 0.00$). As revealed from table (5), there is a clear improvement in mothers' reported practices regarding all items of children poisoning prevention measures at the bathroom post program compared to the minority before the program with highly statistical significant difference (t test = -10.62, $p < 0.00$). Table (6) Shows that, there is a clear improvement in mothers' reported practices regarding all items of children poisoning prevention measures at the storage area post program compared to before the program with highly statistical significant difference (t test = -15.27, $p < 0.00$). As observed from table (7), there was a clear improvement in mothers' reported practices regarding all items of first aid for household poisoning among their children less than 6 years old with SSD ($\chi^2 = 5.48$, $p < 0.05$).

In relation to the total mothers' reported practices regarding first aid of household poisoning among their children less than 6 years old, figure (3) reveals that, there is a clear improvement as observed in 92% of the mothers who follow satisfactory practices after the program implementation compared to 32% only before it

with statistical significant difference ($\chi^2= 18, P= <.05$) before and after program implementation. Table (8) revealed that, there was a statistical significant difference ($\chi^2=21.5, P<0.05$) between mothers' knowledge and their ages. Where satisfactory knowledge was common among the young mothers' who aged $20 < 25$ and $25- < 30$ after program implementation where they represent 60% of mothers in the study. Meanwhile, there is no statistical significant difference ($\chi^2=1.04, P>0.05$) between mothers' educational level and their knowledge.

Part I: Socio-Demographic Characteristics.

Table (1): Distribution of the Studied Mothers according to their Socio Demographic Characteristics (n= 50).

Mothers' Characteristics	Studied Subjects [No.=50(100%)]	
	No	%
Age(Years)		
20<25	15	30
25-<30	17	34
30-<35	12	24
35≥40	6	12
$\bar{X} \pm SD 33.5 \pm 2.9$		
Mothers' Educational level:		
Illiterate		
Read&write	2	4
Secondary education	11	22
University education	27	54
	10	20
Mothers' occupation		
Working	5	10
Housewife	45	90

Figure (1): Distribution of the Studied Mothers' according to the Sources of their Knowledge about Household Poisoning among their Children Less than 6 Years (n= 50).

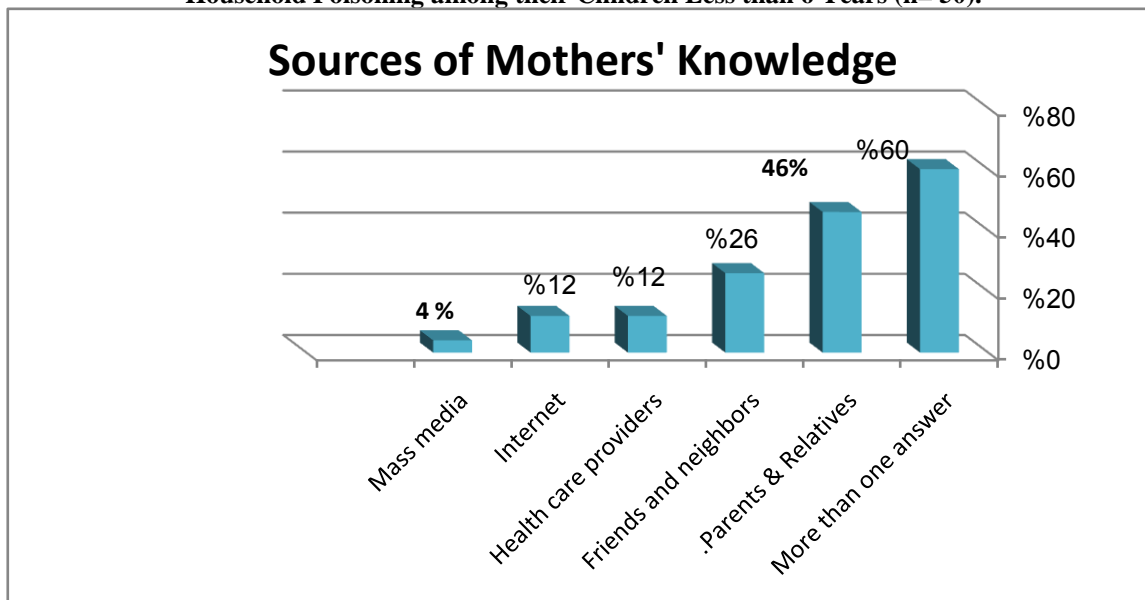


Table (2): Distribution of the Studied Children according to their Socio Demographic Characteristics (n= 50).

Children' Characteristics	Studied Subjects [No. = 50 (100%)]	
	No	%
Number of children less than 6 years for each mother.		
One child		
Two children	29	58
Three children	20	40
	1	2

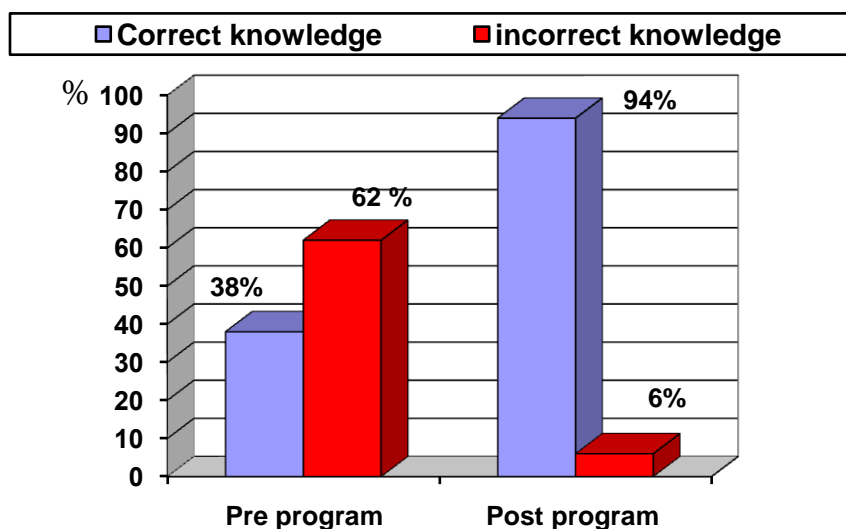
Gender of the children		
Male	40	55.6
Female	32	44.4
Previous Exposure to household poisoning		
Yes	11	22
No	39	78
If yes Cause of poisoning (no=11)		
Cleansing agent	5	45.4
Medication	3	27.3
Chemical	1	9.1
Kerosene	1	9.1
Food	1	9.1

Part II: Mothers' Knowledge related to Household Poisoning.

Table (3): Percentage Distribution of Mothers' Correct Knowledge Regarding Household Poisoning among their Children Less than 6 Years old pre and post Guiding Program (n= 50).

Knowledge Items	Studied Mothers [No. = 50 (100%)]				X ²	P value
	Pre program		Post program			
	No	%	No	%		
Definition of household poisoning.	33	66	48	96	18.9	<.05
Types of household poisoning.	18	36	32	64		
Risk factors of household poisoning.	28	56	45	90		
Route of entry for poisonous substance.	32	64	48	96		
Signs and symptoms of household poisoning.	19	38	49	98		
Prevention of household poisoning.	32	64	47	94		
Importance of first aid for household poisoning.	32	64	43	86		

Figure2 : Percentage Distribution of Mothers' Total Knowledge Score Regarding Household Poisoning of their Children Less Than 6 Years pre and post Guiding Program (N=50).



Part III: Mothers' Practices related to Household Poisoning.

Table (4): Percentage Distribution of Mothers' Reported Practices Regarding Household Poisoning Preventive Measures at the Kitchen pre and post Guiding Program (N=50).

Practice Items	Studied Mothers [No. = 50 (100%)]				Paired t-test	P value
	Pre Program		Post Program			
	Done correctly	Not done	Done correctly	Not done		
	%	%	%	%		
Posting the national poison control hotline number next to every phone in the home.	0	100	58	42	-10.93	0.00
Keeping caustic and potentially poisonous products in their original and labeled containers.	30	70	62	38		
Installing child locks on all cabinets.	10	90	64	36		
Keeping pesticides, cleaning products medications and all other poisonous, toxic or caustic products in a locked cabinet, away from food.	24	76	86	14		
Keeping dangerous products, including cleaning products, medications and chemicals with child-resistant closures.	42	58	88	12		
Reading product use, storage directions and safety recommendations for kitchen products in the home.	10	90	56	44		
Covering all trash cans with a lid.	34	66	68	32		

Table (5): Percentage Distribution of Mothers' Reported Practices Regarding Household Poisoning Preventive Measures at the Bathroom pre and post Guiding program (N=50).

Practice Items	Studied Mothers [No. = 50 (100%)]				Paired t-test	value
	Pre Program		Post Program			
	Done correctly	Not done	Done correctly	Not done		
	%	%	%	%		
Keeping medications, including vitamins, prescribed drugs and over-the-counter drugs, with child-resistant caps.	34	66	74	26	-10.62	0.00
Keeping all medicines and medical supplies in a secure cabinet.	42	58	84	16		
Removing medicine from purses, nightstand drawers, or other locations easily accessed by children.	20	80	66	44		
Flushing unidentified and out-of-date medicines down the toilet.	12	88	82	18		
Keeping medicines in their original containers with the original labels intact.	10	90	74	26		
Reading product use, storage instructions and safety recommendations for cosmetic, personal care and cleaning products.	6	94	46	54		
Installing child safety locks on cabinets where medication, cosmetics and personal care products are stored.	4	96	48	52		

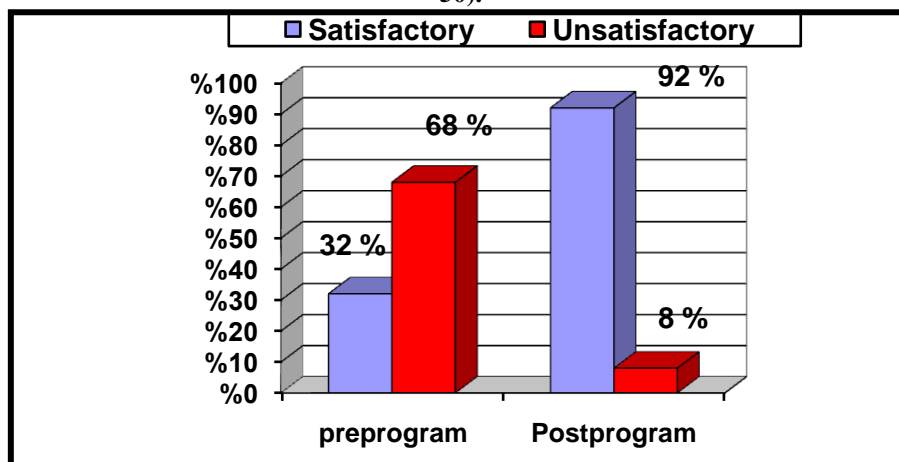
Table (6): Percentage Distribution of Mothers' Reported Practices Regarding Household Poisoning Preventive Measures at Storage Area pre and post Guiding program (N=50).

Practice Items	Studied Mothers [No. = 50 (100%)]				Paired t-test	P value
	Pre program		Post program			
	Done correctly	Not done	Done correctly	Not done		
	%	%	%	%		
Keeping dangerous products such as pesticides, automotive fluids, charcoal lighter fluid, paint thinner, antifreeze, ice-melting products, and turpentine with a child-resistant caps.	30	70	68	32	-15.27	0.000
Keeping all dangerous products locked in a secure cabinet.	34	66	82	18		
Storing gasoline in a storage area or shed in a container approved for gasoline storage.	42	58	84	16		
Keeping flammable items in their original containers and locked in a storage area.	26	74	72	28		
Keeping products in original containers with original labels legible.	22	78	68	32		
Keeping household products out of children's sight and reach.	12	88	74	26		
Careful not to use gasoline for any purpose other than as a motor fuel.	8	92	68	32		
Quickly clean up pools of flammable fluid that may leak onto the floor.	32	68	72	28		

Table (7): Percentage Distribution of Mothers' Reported Practices Regarding First Aid of Household Poisoning among their Children Less Than 6 Years old pre and post Guiding program (N= 50).

Practice Items	Studied Mothers [No. = 50 (100%)]				x ²	P value
	Pre program		Post program			
	Done correctly	Not done	Done correctly	Not done		
	%	%	%	%		
First aid for household poisoning through ingestion.	40	60	92	8	5.48	<.05
First aid for household poisoning through the eyes.	56	44	86	14		
First aid for household poisoning through inhalation.	50	50	82	18		
First aid for household poisoning through skin absorption.	52	48	82	18		
First aid for household poisoning through injection into the skin.	35	65	76	24		

Figure (3):Percentage Distribution of Total Mothers' Reported Practices Regarding First Aid of Household Poisoning among their Children Less Than 6 Years old pre and post Guiding Program (N= 50).



$\chi^2 = 18, P = <.05$

Part IV: Statistical Association between Study Variables.

Table (8):Distribution of Mothers According to Relation between Total Knowledge Score Level and their Socio-Demographic Characteristics (N=50).

Socio-Demographic	Knowledge Score level								χ^2	P value
	Pre				Post					
	Correct		Incorrect		Correct		Incorrect			
	No	%	No	%	No	%	No	%		
Age (Years)										
20 < 25	6	12	9	18	15	30	0	0	21.5	<.05
25- < 30	12	24	5	10	15	30	2	4		
30- < 35	9	18	3	6	8	16	1	2		
35- ≥ 40	4	8	2	4	9	18	0	0		
Mothers' Educational level										
Illiterate	2	4	0	0	2	4	0	0	1.04	>.05
Read & write	5	10	6	12	10	20	1	4		
Secondary education	16	32	11	22	25	50	2	0		
University education	8	16	2	4	10	20	0	0		
Mothers' occupation										
Working	3	6	2	4	4	8	1	2	1.93	>.05
Housewife	28	56	17	34	43	86	2	4		

IV. Discussion

Poisoning is occurring when cells are injured or destroyed by the inhalation, ingestion, injection or absorption of a toxic substance. Key factors that predict the severity and outcome of poisoning are the nature, dose, formulation and route of exposure to the poison; co-exposure to other poisons; state of nutrition of the child, age and pre-existing health conditions. Children are curious and explore their world with all their senses, including taste. As a result, the home and its surroundings can be a dangerous place when poisonous substances are inadvertently ingested. Every year millions of calls are made to poison control centers when this happens and thousands of children are admitted to emergency departments. Poisoning patterns change according to age group, type of exposure, the nature and dose of the poison (WHO, 2008). Acute poisoning is a common cause of morbidity and mortality among children accounting for more than 1 million cases annually reported to the Toxic Exposure Surveillance System (TESS) of the American Association of Poison Control Centers (AAPCC). The high prevalence of acute poisoning in children is attributed to the curiosity of the children especially those aged less than 5 years to virtually taste or swallow harmful substances (Rodgers et al., 2007). Regarding the studied

mothers' age, the current study showed that, the studied mothers were in age ranged from 20- \geq 40 years with \pm SD 33.5 ± 2.9 . These findings were in accordance with *Megahed et al. (2017)* who found in a similar study that the selected mothers' age was ranged from 20-43 years and \pm SD 29.56 ± 5.42 . This similarity may be related to the reproductive age of the selected mothers who have children less than 6 years old. In relation to the studied mothers' educational level, the current study proved that, more than half of the studied mother were secondary education, this result was in contradiction with study of *Dayasiri et al., 2017*, who reported in a similar study that primary level of education and mother working during the daytime were family related risk factors for acute unintentional pediatric poisoning. As regards the occupation of the studied mothers, the current study showed that most of the studied mothers were housewives; this study was in agreement with the study of *Abd El-Aty et al., 2005*, who found in a similar study that, most of the mothers were not working. Concerning the sources of the studied mothers' knowledge regarding household poisoning among their children less than 6 years, results of the current study showed that, nearly half of the studied mothers get their knowledge from parents and relatives, while the minority of them get their knowledge from the internet. These results may be related to the conduction of the current study on mothers who are living in rural areas. These results were contradicted with the study results of *Gholap (2017)*, who reported in a similar study that, the knowledge of more than half of the studied mothers was obtained from T.V. and Radio, while more than one quarter of them get their knowledge by witnessed home accidents and less than one fifth of them obtained the knowledge from news and magazines. Meanwhile, *Kamel et al. (2015)*, in a similar study reported that, the main source of knowledge was the television, while relatives and friends constituted the second source of knowledge among the low and moderate educated mothers. Also *Mohammed et al. (2013)*, reported in a similar study that, more than one third and two fifths of the mothers, their sources of knowledge were relatives and mass media (T V & radio) respectively. With regard to the number of children less than 6 years old for each mother, the current study showed that, more than half of the studied mothers are having one child less than 6 years old and two fifths of them are having two children. These results were parallel with the results of *Barghash et al. (2016)* who reported in a similar study that, more than two fifths of studied mothers had two children less than 6 years. In the same context, *Abd El-Aty et al. (2005)* found in their study that more than two fifths (45.0%) of the studied mothers had two children less than six years old. These results were in contradiction with the study results of *Nour et al. (2018)*, who found in their similar study that more than half of the studied mothers had more than two children aging 2-6 years. This may be due to the difference of study settings and population cultures. Regarding the previous exposure of studied children to household poisoning, the current study showed that, the majority of children who are exposed to poisoning are exposed to cleansing agent and medication poisoning. This is may be due to the fact that those substances are often the most commonly accessible household products. These results were in accordance with *WHO, (2008)*, as stated that, common poisoning agents in low-income and middle-income countries are fuels such as paraffin and kerosene, pharmaceuticals and cleaning agents. These results were in agreement with *Maklad et al., (2012)*, who stated that, among the total cases of acute poisoning in children admitted at Ain Shams University in Cairo (Poison Control Center) during the year 2004, chemical and household products represent the highest percentage of poisoning. Most of them were insecticide, corrosives, and hydrocarbons. These results were supported by *Hassan and Siam (2014)*, who stated in a similar study that, cleaning and disinfectant agents were involved in 17.0% of the poisoning cases; the most commonly involved agents were bleaches like sodium hypochlorite (Clorox), disinfectant, like chloroxylenol (Dettol), laundry detergents, phenol (carbolic acid), and potash. These results were contradicted with the study results of *Dayasiri et al., (2017)*, who mentioned that, the commonest poison was kerosene oil as observed in more than fifth among the commonly poisoning substances of the selected subjects. Also *Mansori et al., (2016)*, in a similar study result reported that, most common types of poisoning were related to narcotics and medicinal products. In relation to the effect of guiding program on mothers' health awareness regarding household poisoning of their children less than six years old, results of the current study showed that, most of the studied mothers their knowledge were correct after the guiding program regarding all items of household poisoning compared to before the program that reflects highly statistical significant difference ($X^2 = 18.9$ with $p < .05$) pre and post the program that explain the importance of guiding program for mothers regarding household poisoning. These results were supported by *WHO (2005)*, who stated that, poisons prevention programs become a priority and initiated as a response to people's needs and demands. Poisoning programs addressing problems before they start to grow may prevent disasters occurring. In the same context *Sackitey (2018)*, mentioned in a similar study that, accidental swallowing of drugs and detergents were not much known among the respondents as triggers of home accidents since a significant number of the respondents showed less knowledge in that regard. As regards the total mothers' knowledge, this study showed that, less than two fifths of the studied mothers had satisfactory level of knowledge before the guiding program implementation compared to the majority of them after the program with statistical significance difference. This result was parallel with the results of a similar study done by *Lafta et al. (2013)*, who reported that, less than tenth of mothers had good knowledge regarding dealing with chemicals and detergents, and more than 90% were categorized as having poor knowledge. Concerning the

mothers' reported practices regarding children household poisoning preventive measures in the kitchen, the results of our study showed that, none of the studied mothers were knowing or posting the national poison control hotline number in home before the guiding program compared to more than half of them after program implementation. While, the minority of them (one fifth) were installing child locks on all cabinets and the majority of them (nine ninths) don't read product use, storage directions and safety recommendations for kitchen products in the home. This may be due to the fact that, there is a defect in health awareness of the studied mothers regarding national poison control hotline number and safety measures for home products handling. These findings were supported by *Sivri and Özpulat (2015)*, who mentioned that, advancement of technology and improvement of socioeconomic status has led to more industrial and petroleum products, drugs and bleaches in homes. The negligence of families and those who are involved in child care, ignorance about poisoning, packaging of produced drugs in attractive colors, launch of pesticides for cheapest price to the market, uninformed use of drugs, nonprescription sale of some drugs and leaving them within reach of children lead to increase in poisonings. Moreover, only two fifths of the studied mothers keeping dangerous product, cleaning products, medications and chemicals in containers with child-resistant closures before guiding program implementation compared to more than four fifths after program implementation with highly statistical significance difference. This may be due to lack of mothers' knowledge and health awareness regarding household accidents and injuries prevention which improved obviously after program implementation. These findings were supported by *Mohammed et al., 2013*, who proved in a similar study that, there was a statistical significant difference between pre and post supportive strategy in relation to mothers' practices regarding positioning. In investigating mothers' reported practices regarding children household poisoning prevention measures in the bathroom, findings of the current study showed that, only one third of the studied mothers are using child-resistant caps for medications, including vitamins, prescription drugs and over-the-counter drugs before program implementation compared to nearly three quarters after program implementation. Furthermore, nearly one tenth of them are flushing unidentified and out-of-date medicines down the toilet. This may be due to mothers' lack of knowledge about hazardous effects for random using of the drugs and serious effects for using out-dated medicines. These findings were coincided with the findings of *Ramos et al., 2010*, who mentioned in their similar study that, there is evidence of an association of behavioral antecedents of parents (distraction), storage of agents (height), and knowledge of the toxic action of agents available in the home with childhood poisoning, when controlled for the variables that make up the risk factor "lack of knowledge". As regards mothers' practice related to children poisoning preventive measures at storage area, results of the current study proved that, the minority of the studied mothers are keeping household products out of children's sight and reach, which is improved after the guiding program implementation. This may be a major risk factor for children household poisoning because drugs and other chemical accessibility and children curiosity to discover the surrounding environment and their sense of autonomy increasing their risk of household poisoning. Furthermore, our findings proved that more than nine ninths of the studied mothers having a wrong concept for using gasoline for purposes other than as a motor fuel as stated by them, they sometimes using it for cleaning flooring, new installed ceramic, heavily soiled clothes, clothes with hard stains and polishing of wooden furniture, which represent a major risk factor not only for children poisoning, but also a tremendous risk factor for fire and death. With regard to the effect of educational program on mothers' practice related to first aid of household poisoning among their children less than six years old, it was observed that, there was a clear improvement in mothers' reported practices regarding all items of first aid for household poisoning. Furthermore, *Eldosoky, (2012)*, stated in a similar study that, although home-related injuries are a common problem among rural children aged up to the age of 12 years, the studied mothers did not have enough knowledge regarding first aid practices in these situations. Also, *Sackitey, (2018)*, recommended in a similar study that, there is an urgent need for educational programmer regarding home accidents and its management for mothers who have young children. Health education program regarding the management of the home, first aid administration as well as prevention of home accidents should be encouraged among mothers. Moreover, *Washington Poison Center (2012)*, mentioned that, Increase knowledge of poison prevention measures that can be taken reduce the risk of accidental poisonings. Concerning the relationship between mothers' age and their knowledge about poisoning, our study reported that, there was a statistical significant difference between mothers' knowledge and their ages; where correct knowledge was common among the young mothers' as observed in less than two thirds of them. This may be the fact that young mothers have enough time to get knowledge through mass media and internet. This result was in contradiction with *Kamel et al. (2015)*, who reported in an Egyptian similar study that, the well-educated and the older mothers have better knowledge, attitude and practice regarding home injuries than other mothers. As regards relationship between mothers' education and their knowledge about poisoning, the current study proved that there is no statistical significant difference between mothers' educational level and their knowledge. This result was inconsistent with *Sivri and Özpulat, (2015)*, who proved in a similar study that an increase of poisoning knowledge scores during increase

of mothers' education level was observed. Also, *Banfai et al., (2015)*, reported in a similar study that, there was significant correlation between the knowledge assessment and the educational attainment.

V. Conclusion

Based on the study's results, it was concluded that, more than one third (34 %) of the studied mothers' age ranged from 27 - 33 years old, with \pm SD 33.5 ± 2.9 . years. more than half (58%) of the studied mothers having one child less than 6 years old. Nearly one half (45.4%) of the children who exposed to poisoning are exposed to cleansing agent poisoning. More than two fifth (46%) of the studied mothers get their knowledge from parents and relatives. Most [96%, 90% and 94%] of the studied mothers their knowledge were correct after the program regarding all items of poisoning. There is a clear improvement in mothers' reported practices regarding all items of children' household poisoning preventive measures after guiding program implementation compared to the minority before the program. Moreover, there was a clear improvement in mothers' reported practices regarding all items of first aid for household poisoning among their preschool children with SSD ($X^2 = 5.48, p < 0.05$), there was a statistical significant difference ($X^2=21.5, P<0.05$) between mothers' knowledge and their ages.

VI. Recommendation

According to these findings, the current study recommended the following:

1. Establishing preventive educational programs for mothers in MCH centers and outpatient clinics regarding safety home environment and household poisoning of their children less than 6 years.
2. Providing education program about household poisoning prevention, home accidents, first aid management and method of prevention for students in school curriculum at different levels and through mass media.
3. Using warning labels with healthy knowledge and practices including first aid tips about household poisoning in M.C.H centers
4. Improving community health awareness about poisoning prevention and how to provide first aid for children in emergency situations through mass media specially television.
5. Health education program for mothers about safe housing condition should be held in MCHC.

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