

KNOWLEDGE, ATTITUDE AND PRACTICE OF MOTHERS TOWARDS HOUSEHOLD CHILD TOXICITY AND UNUSED MEDICATIONS: ISMAILIA, EGYPT

Shaimaa A. Shehata¹, Hebatalla M. Aly², Shrouk Mohamed Ali¹, Mohamed A. Badr³,
Khadiga M. Abdelrahman¹

¹Department of Forensic Medicine and Clinical toxicology, Faculty of Medicine, Suez Canal University, Egypt, ²Department of Public Health, Community, Occupational and Environmental Medicine, Faculty of Medicine, Suez Canal University, Egypt, ³Suez Canal University Hospitals, Egypt

ABSTRACT

Background: Childhood poisoning is mainly unintentional and may occur due to either pharmaceutical or non-pharmaceutical agents. Improper disposal of unused medication plays a role in the rise of child toxicity. The study aimed to improve mother's knowledge, attitude and practice toward household toxicities and unused medications and how they dealt with them, which can prevent or reduce childhood mortalities and morbidities. **Objectives:** To assess mothers' knowledge, attitude and practice toward most household toxicities and dealing with unused medication. **Methods:** This cross-sectional study recruited a sample of mothers attending the pediatrics clinic, emergency department, or inpatient department of the Suez Canal University teaching hospital. The study was conducted from July 2022 to September 2022. The questionnaire included socio-demographic data, knowledge, attitude, and practice regarding household child toxicity and unused or expired medications. **Results:** One hundred and fifty-seven participants were enrolled in the study. The mean participant age was 33.6±8.5 years, 45% were housewives, and 71% of participants were highly educated. Nearly a quarter of mothers stated that their children were intoxicated. Detergents and caustics were the toxic agents causing about 47% of cases. Fifty-one percent of participants had moderate knowledge, 97.5% had a positive attitude, and 36.3% had poor practice. More than half of the participants have not received any information about the safe disposal of unused or expired medications. **Conclusion:** Most of the mothers in this study had a positive attitude toward dealing with childhood toxicity. There was a shortage of adequate information on safe medication disposal practices.

Keywords: Pediatric, poisonings, childhood, expired medication, unneeded.

Corresponding author: Dr. Shaimaa A. Shehata

Email: shaimaa_shehata@med.suez.edu.eg

<https://orcid.org/0000-0002-2810-3613>

INTRODUCTION

Childhood poisoning is one of the most common causes of mortality and morbidity worldwide (*Bandyopadhyay and Mandal, 2017*). Pediatric poisoning is mainly unintentional and may occur due to either pharmaceutical or non-pharmaceutical agents (*Alwan et al., 2022*). The World Health Organization estimates that fifty percent (50%) of all poisoning victims are children under the age of six (*Peden, 2008*). A recent National Poison Data System (NPDS) report documented that children under five years accounted for 41.7% of total human exposures (*Gummin et al., 2021*). Poisoning is considered the fourth cause of unintentional injury after road traffic injuries, fires and drowning (*Ahmed et al., 2015*). The

prevalence of poisoning differs between countries because of cultural traditions regarding child supervision, regional customs and beliefs, as well as a number of other reasons (*Alshahrani et al., 2023*). The pediatric poisoning clinical picture differs according to mixed factors, including the type of poison ingested, the route of exposure, and the presence of other poisons (*Abo et al., 2021*).

Despite advances in preventive measures and public awareness to reduce accidental pediatric poisoning, it remains a significant problem (*Nistor et al., 2018*). Children are curious about everything in and around the house, including potentially hazardous areas, which raises the risk of accidental poisoning (*Alruwaili et al., 2022*).

Unfortunately, thousands of children are treated in emergency departments after consuming some type of household product, medicine, or pesticide (Abo et al., 2021). Several household substances contribute to child intoxication, such as over-the-counter (OTC) medicines, batteries, pesticides, household cleaners, kerosene, and chlorine (Peshin and Gupta, 2018). Pesticides are thought to be one of the most common causes of death-related poisoning (Varghese and Erickson, 2022).

Ingestion of disc batteries by children has increased in recent years. There are serious complications that could need urgent endoscopic or surgical intervention associated with battery ingestion (Lorenzo et al., 2022). Some poisonous substances are colored and usually found in cupboards. There are an increasing number of children who have unintentionally swallowed these products (Nageh et al., 2020).

Poisoning can be decreased by applying prevention techniques, such as removing poisonous substances from areas where they are easily accessible, switching poisonous products for safer ones (such as aspirin for paracetamol), and using child-resistant packaging for poisonous substances (Azab et al., 2016).

The storage of unused and expired drugs at home carries the risk of child intoxication (Amoabeng et al., 2022). For multiple reasons, patients might not use all their prescribed medications, like patient improvement, dosage variations, intolerance of adverse effects, and medicine expiration (Kahsay et al., 2020). The improper prescription and sale of more than half of all drugs endangers the environment (Law et al., 2015). Drugs kept at home are more likely to be used for self-medication, which can have a number of negative effects. Many customers choose to keep their medications since they are unsure of how to do so, other customers discard these medications in improper ways (Teni et al., 2017). This improper disposal of unused and expired medications reaches the water areas (Naser et al., 2021).

Importantly, the disposal of pharmaceutical waste into water has both short and long-term effects on human health and the environment

(González Peña et al., 2021; Kayode-Afolayan et al., 2022).

Parents, especially mothers, should have appropriate knowledge regarding poisonous substances at home and regarding first-aid measures in accidental poisoning cases that may increase the chances of survival for the poisoned child, and make a better prognosis (Al-Johani et al., 2018). Moreover, they should acquire appropriate knowledge regarding the appropriate disposal of medicines (Adedeji-Adenola et al., 2022).

The primary responsibility of mothers is to provide an appropriate environment for their kids. Improving mothers' knowledge, attitudes, and self-efficacy will raise their self-competence in providing first aid for their children when necessary. Prevention of unintentional drug consumption in children has become a crucial goal for children's wellness and health promotion (Al-Johani et al., 2018; El Seifi et al., 2018a).

It is important to reduce the negative impact of pharmaceutical compounds on child toxicity and environmental pollution (Alssageer et al., 2022). Proper public education on the appropriate disposal of medicines is an important issue to enhance the safety of people and the environment (Adedeji-Adenola et al., 2022).

Programs supporting proper disposal practices of unused medicines at home are still limited in many developing countries (Alssageer et al., 2022).

THE AIM OF THE WORK

The research question is “Are Egyptian mothers have good knowledge, attitude and practice towards household child toxicity and unused medications?”

The current study aimed to improve a mother's knowledge, attitude and practice toward household toxicities and dealing with unused medications which can prevent or reduce childhood mortalities and morbidities related to household toxicities.

SUBJECTS AND METHODS

Study Design and Setting

This was a cross-sectional study which conducted in the pediatrics outpatient clinic, emergency department, or inpatient department of Suez Canal University teaching hospital and primary health care units in

Ismailia, Egypt. The study was conducted from July 2022 to September 2022.

Study population (Inclusion and Exclusion criteria)

Data was included from:

- Mothers attending pediatrics outpatient clinic, emergency department or inpatient department of Suez Canal University teaching hospital.
- Mothers who are members of Ismailia social media female groups.
- Mothers who refuse to participate were excluded.

Sample Size and Technique

Sample size will be calculated using the following equation (*Dawson and Trapp, 2004*).

$$n = \left[\frac{Z_{\alpha/2}}{E} \right]^2 * P(1 - P)$$

Where:

n= sample size

Z $\alpha/2$ = 1.96 (The critical value that divides the central 95% of the Z distribution from the 5% in the tail)

p = the prevalence of correct knowledge total score among mothers = 38% (*Abo et al., 2021*).

E = the margin of error (=width of confidence interval) = 10 %

So, this gives a minimum sample size of 90 mothers.

Sampling technique: convenient sampling method was used where all available mothers in the mentioned setting during the time of the study were recruited till completion of sample size. Twenty percent was added to compensate for incomplete questionnaires that will be excluded. Recruited subjects from the above-mentioned settings were asked to fill out either the Google form online by sending her the link or a hard copy of the questionnaire if they did not have internet access at the time of data collection.

Tools of the study

The questionnaire encompassed from three parts:

- *Part 1: Socio-demographic data:* This included age, sex, marital status, working place, levels of education.
- *Part 2:* This included frequency of household toxicity among children and history of

toxicity (times, order of child, timing, place, type of agent and treatment).

- *Part 3: Household toxicity:* This includes questions for assessment of knowledge, attitude and practice regarding household child toxicity which were adopted from previous research (*BakrMoshtohry et al., 2018; El Seifi et al., 2018b; Makki et al., 2021*).
- *Part 4: Unused/ expired medications:* This includes questions for assessment of knowledge, attitude and practice regarding safe disposal of unused/ expired medications adopted from (*Makki et al., 2021*).

Administrative and Ethical design

The current study methods were carried out in accordance with relevant guidelines and regulations (Declaration of Helsinki). The study was approved by the Ethics Committee of the Faculty of Medicine, Suez Canal University, Egypt (*reference number is #4940*). Written informed consent was obtained from all subjects. Clicking an agreement button in the information page, beside the completion of the questionnaire, indicated the participants agreed and consenting to participate in the study. An anonymous questionnaire was used throughout data processing to ensure data confidentiality.

Statistical Analysis:

Data were entered into SPSS version 23 (SPSS, 2015). Quantitative data as age and knowledge score were presented as mean and standard deviation while qualitative variables as percent of correct answers and prevalence of toxicity were presented as frequency and percentage. Chi square test was used to assess the difference in prevalence of toxicity and correct answers among different maternal characteristics as education level and residence. Binary logistic regression analysis was used to find out the most significant risk factor for household child toxicity. P-value<0.05 was considered significant.

RESULTS

One hundred and fifty-seven participants were enrolled in the study. Socio-demographic characteristics of participants are shown in **table (1)**. Mean participants age was 33.6±8.5. About 45 % were housewives. About 71% of participants had university or

postgraduate education. Eighty four percent stated that they have moderate monthly income and 73% lived in urban areas. More than two thirds of participants have only one child under 6 years old. Participants were asked about the history of household toxicity among their children and 24.2% answered yes (**Figure 1**).

Participants with positive history of child household toxicity were asked about toxicity details and results are shown in table 2.

About 92% experienced household toxicity only once, 86% of cases occurred in child's house and most cases 74% occurred in the morning or afternoon. The kitchen was the place for more than 60% of cases of toxicity.

Table (1): Socio-demographic characteristics of the studied mothers (n=157).

Characteristic	Frequency	Percent
Age in years		
< 30	64	40.8
30 – 45	81	51.6
> 45 - 60	12	7.6
Mean ± SD	33.6 ± 8.5	
Occupation		
Housewife	72	45.9
Governmental sector	56	35.7
Private sector	29	18.5
Highest mother education		
Illiterate	3	1.9
Primary/ preparatory	11	7
Secondary / technical	31	19.7
University/ postgraduate	112	71.3
Highest father education		
Illiterate	6	3.8
Primary/ preparatory	12	7.6
Secondary/ technical	28	17.8
University/ postgraduate	111	70.7
Monthly income		
Low	11	7
Moderate	132	84.1
High	14	8.9
Residential area		
Urban	115	73.2
Rural	42	26.8
Number of family members		
3	32	20.4
4	49	31.2
5	48	30.6
6 or more	28	17.8
Number of children < 6 years old		
1	104	66.2
2	44	28
3	6	3.8
4	3	1.9

Detergents and caustics were the toxic agents causing about 47% of cases followed by medications toxicity affecting about 24% of cases. About 31% of mothers did not give anything to their children after toxicity while about 37% gave milk either alone or with water or raw eggs. More than half (55.3%) went to the hospital within one hour of toxicity. Thirty-seven out of thirty-eight cases (97.4%) showed full recovery post treatment and only one case had residual complications as shown in **table (2)**. Participants were asked about the most common cause of toxicity in their opinions and results are shown in **figure (2)**.

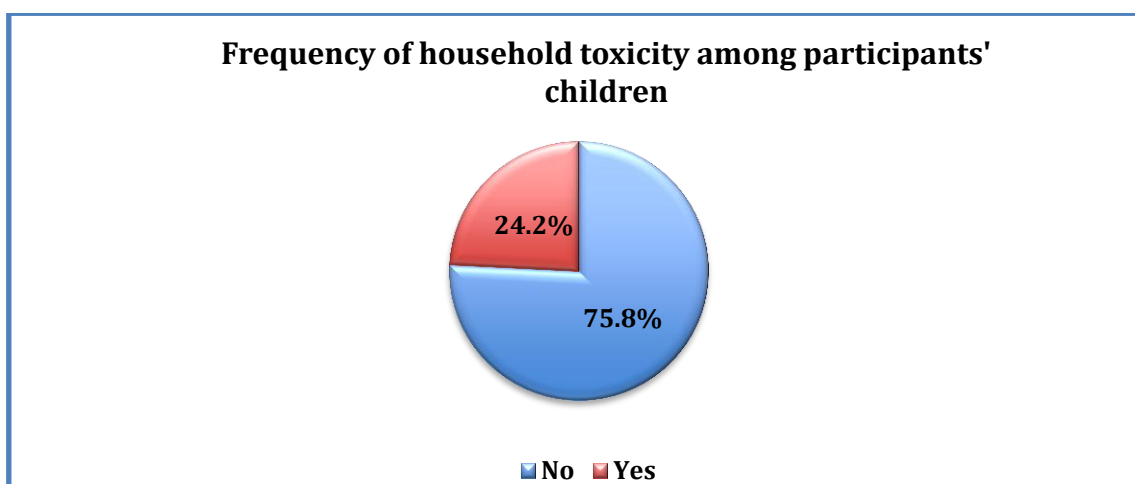


Figure (1): Frequency of household toxicity among children of the studied mothers (n = 157).

Table (2): History of toxicity among the studied mothers who stated previous history of child household toxicity (n = 38).

History		Frequency	Percent
Number of times of child toxicity	Once	35	92.1
	Twice	3	7.9
Sex of child exposed to toxicity	Male	19	50
	Female	14	36.8
	both	5	13.2
Order of child exposed to toxicity among his siblings	1 st	16	42.1
	2 nd	17	44.7
	3 rd	3	7.9
	4 th or later	2	5.3
Timing of toxicity	Morning	13	34.2
	Afternoon	15	39.5
	Evening	10	26.3
Place of toxicity	Child's house	33	86.8
	Relative's house	5	13.2
place of toxicity within the house	Kitchen	23	60.5
	Bathroom	4	10.5
	Bedroom	4	10.5
	Living room	6	15.8
	Balcony	1	2.6
Type of toxic agent	Medications	9	23.7
	Detergents/ caustics	18	47.4
	Insecticides	3	7.9
	Food poisoning	7	18.4
	drugs	1	2.6
Action taken at home soon after toxicity	Nothing	12	31.6
	Give milk	11	28.9
	Give water/ salt water	6	15.8
	Give emetic drugs	5	13.2
	Give raw eggs	1	2.6
	Give milk and water	2	5.3
	Give milk and raw eggs	1	2.6
Did you go to the hospital?	No just home treatment	11	28.9
	Yes, within one hour	21	55.3
	Yes, within 1 – 6 hours	6	15.8
Post treatment	Full recovery	37	97.4
	Residual complications	1	2.6

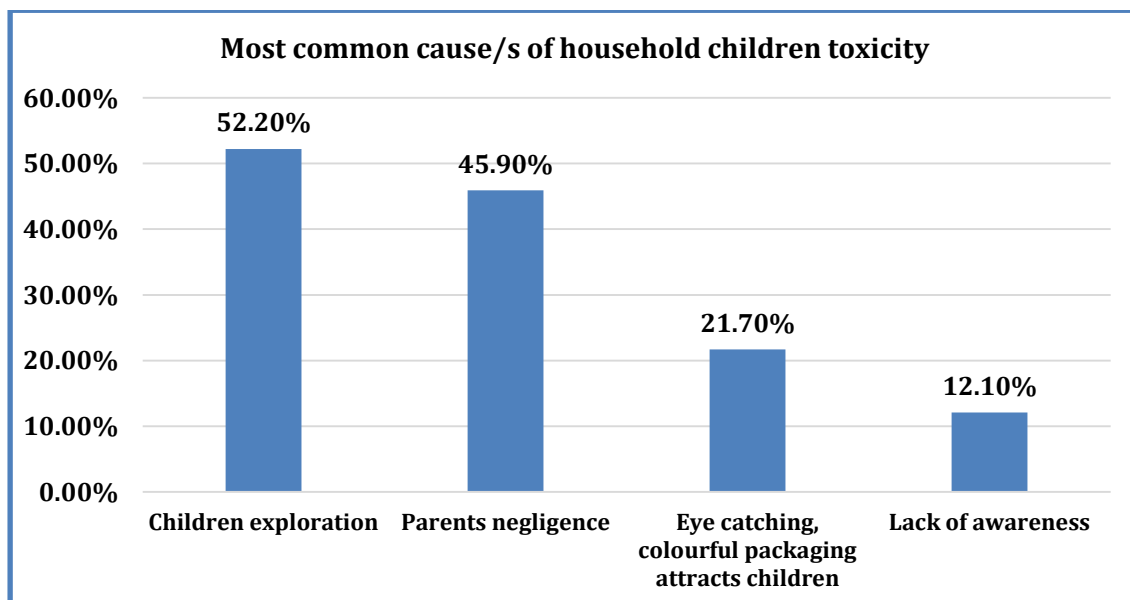


Figure (2): Frequency of most common cause/s of household children toxicity in participants opinions (more than one answer could be selected, n = 157).

Knowledge, attitude and practice of participants regarding household children toxicity were assessed and result are shown in **table (3)**. Fifty one percent of participants had moderate knowledge and 38.2% had good knowledge. Regarding attitude 97.5% of participants had positive attitude. Practice include 12 items a score of 9 or higher is considered good practice (63.7% of participants had good practice. Participant's knowledge, attitude and practice towards unused or expired medications are shown in **tables (4–6)**. More than half of participants have not received any information about safe disposal of unused or expired medications, and 41 percent do not know the correct way

of disposal. Fifty-four percent stated that the reason for keeping medications at home was for future use. The difference in knowledge grades among different socio-demographic characteristics are shown in **table (7)**. High education and moderate to high income were associated with higher frequency of good knowledge and these were statistically significant. Working mothers had higher frequency of good knowledge compared to housewives and this was statistically significant, but practice did not differ significantly.

Table (3): Knowledge, attitude and practice regarding household children toxicity among the studied mothers (n = 157).

KAP		Frequency	Percent
Knowledge	Poor knowledge (score < 50%)	17	10.8
	Moderate knowledge (50 – 75%)	80	51
	Good knowledge (score > 75%)	60	38.2
	Mean score (total =18)	12.2±3.1	
	Mean percentage	67.9±17.2	
Attitude	Negative attitude (negative and zero scores)	4	2.5
	Positive attitude (positive scores)	153	97.5
Practice	Poor practice (score < 9)	57	36.3
	Good practice (score ≥ 9)	100	63.7

Table (4): Knowledge about unused/expired medication among the studied mothers (n =157).

Knowledge	Frequency	Percent
Have you ever received information about safe disposal of unused or expired medications?		
• No	82	52.2
• To some extent	49	31.2
• Yes	26	16.6
What are the sources of your information?		
• Mass media	37	23.6
• Family and friends	37	23.6
• Educational seminars	1	0.6
• Reading	27	17.2
• School	19	12.1
• Medical staff	12	7.6
• No information	24	15.3
Do you know the correct way of disposal of unused or expired medications?		
• No	64	40.8
• May be	36	36.8
• Yes	57	22.3
What are the reasons for keeping medicine at home? (More than one option can be chosen)		
• The doctor changed treatment.	20	12.7
• May be used in the future.	84	53.5
• Discontinued use after improvement	58	36.9
• Discontinued use due to side effects	9	5.7
• Many prescriptions	17	10.8
• Expiry	5	3.2
• Others	7	4.5

Table (5): Attitude towards unused/expired medications among the studied mothers (n=157).

Attitude	Frequency	Percent
Do you think that reading medication pamphlets to know how to store them is important?		
• Strongly disagree.	2	1.3
• Disagree	8	5.1
• Not sure	4	2.5
• Agree	60	38.2
• Strongly agree	83	52.9
Do you think it is important to know the expiry date of a drug?		
• Strongly disagree.	1	0.6
• Disagree	5	3.2
• Not sure	9	5.7
• Agree	138	24.2
• Strongly agree	104	66.2
Do you think that children are at more risk of toxicity from unused/ expired medications at home?		
• Strongly disagree.	1	0.6
• Disagree	5	3.2
• Not sure	19	12.1
• Agree	64	40.8
• Strongly agree	68	43.3
Do you think there is a lack of sufficient information about safe disposal of unused/ expired medications?		
• Strongly disagree	4	2.5
• Disagree	7	4.5
• Not sure	18	11.5
• Agree	70	44.6
• Strongly agree	58	36.9
Do you think that healthcare professionals provide sufficient information about safe disposal of unused/ expired medications?		
• Strongly disagree	10	6.4
• Disagree	22	14
• Not sure	46	29.3
• Agree	37	23.6
• Strongly agree	42	26.8
Would you like to participate in a health education program about methods of safe disposal of unused/ expired medications?		
• Strongly disagree.	2	1.3
• Disagree	2	1.3
• Not sure	7	4.5
• Agree	51	32.5
• Strongly agree	95	60.5

In your opinion how can we control or minimize the negative impact of unused/ expired medications?		
• Provide adequate instructions to users.	52	33.1
• Prescribing medications in prescribed doses and durations.	36	22.9
• Reduce the number of medications prescribed at the same time as possible.	2	1.3
• Donate unused medications	25	15.9
• Do not know	42	26.8

Table (6): Practice of unused/expired medications among the studied mothers (n=157).

Practice	Frequency	Percent
Do you check disposal instructions before disposing unused/ expired medication?		
• Never	17	10.8
• Rarely	14	8.9
• Sometimes	37	23.6
• Often	36	22.9
• Always	53	33.8
Do you dispose unused/ expired medications in the toilet?		
• Never	51	32.5
• Rarely	14	8.9
• Sometimes	27	17.2
• Often	18	11.5
• Always	47	29.9
What are the reasons for not using medicines? (More than one option can be chosen)		
• Improvement of medical conditions.	101	64.3
• Changing medications by the physician.	44	28
• Encountering side effects.	18	11.5
• Keep them for future use.	35	22.3
What do you do with unused medications that are not yet expired?		
• Leave at home till expiry date for future use.	94	59.9
• Throw them in the trash.	15	9.6
• Throw them in the toilet or sink.	14	8.9
• Collect them at the drug disposal site.	26	16.6
• Take them to the pharmacist to get rid of them or give them to someone else.	26	16.6
• Give them to relative or friend.	35	22.3
• Donate to charity.	23	14.6
• I do not know what to do with them.	13	8.3

Table (7): Relation between socio-demographic characteristics and knowledge grades regarding household children toxicity among the studied mothers (n=157).

Socio-demographic characteristics	Knowledge grades			p-value
	Poor	Moderate	Good	
Age in years				0.745 ¹
• <30	8 (12.5%)	33 (51.6%)	23 (35.9%)	
• 30 – 45	8 (9.9%)	39 (48.1%)	34 (42%)	
• >45	1 (8.3%)	8 (66.7%)	3 (25%)	
Occupation				0.030^{1*}
• Housewife	10 (13.9%)	43 (59.7%)	19 (26.4%)	
• Governmental sector	3 (5.4%)	23 (41.1%)	30 (53.6%)	
• Private sector	4 (13.8%)	14 (48.3%)	11 (37.9%)	
Highest mother education				0.001^{2*}
• Illiterate	2 (66.7%)	1 (33.3%)	0 (0%)	
• Primary/ preparatory	2 (18.2%)	8 (72.7%)	1 (9.1%)	
• Secondary / technical	4 (12.9%)	21 (67.7%)	6 (19.4%)	
• University/ postgraduate	9 (8%)	50 (44.6%)	53 (47.3%)	
Monthly income				< 0.001^{2*}
• Low	5 (45.5%)	4 (36.4%)	2 (18.2%)	
• Moderate	12 (9.1%)	73 (55.3%)	47 (35.6%)	
• High	0 (0%)	3 (21.4%)	11 (78.6%)	
Residential area				0.078 ²
• Rural	6 (14.3%)	26 (61.9%)	10 (23.8%)	
• Urban	11 (9.6%)	54 (47%)	50 (43.5%)	

1. Chi square test;

2. Exact test;

*statistically significant at $p < 0.05$.

List of Abbreviations:

Abbreviation	Meaning
NPDS	National Poison Data System.
WHO	World Health Organization
OTC	Over The Counter.

DISCUSSION

Poisoning is a widespread public concern as markets become increasingly flooded with chemicals, medications, and natural toxins (Halawa et al., 2013). Patients may not use all of the medications prescribed to them for a variety of reasons. Drug storage at home might have a number of negative repercussions (Kahsay et al., 2020). In general, knowledge can influence an individual's attitude, which can then be reflected in their behaviors and practices (Makki et al., 2021). Therefore, this study was aimed to assess mothers' knowledge, attitude, and practice toward household toxicities and unused medications and how they dealt with them, which can prevent or reduce childhood mortalities and morbidities related to them.

The current study found that more than half of the participants were 30 or older, and the majority of them had university or postgraduate education, which is consistent with studies conducted in Ethiopia (Ayele and Mamu, 2018; Kahsay et al., 2020). The findings were contradictory to (Moshtohry et al., 2018). This discrepancy in our findings could be attributed to the fact that this study was conducted on moms who live in rural areas, the majority of whom married at a young age and have low to moderate educational levels.

According to the current findings, the majority of poisoned children came from urban regions and families with moderate socioeconomic status. The same found by (Abu El-Naga et al., 2022). The findings differ from those of Aggarwal et al. (2014), and El-Shoura et al (2016). This can be linked to people's negligence and a difficult lifestyle, as well as the improper usage of agricultural insecticides in some rural areas.

There was a relatively higher prevalence of males than females among the children of households poisoning. The same was discovered in prior studies (Aggarwal et al., 2014; Azab et al., 2016; Farag et al., 2020). Male dominance could be attributed to their aggressive and inquisitive temperament, their relative freedom in society, a higher degree of stress due to expectations and social responsibilities in the family, and a referral

bias towards boys for hospitalization over girls (Rajapakse et al., 2013; Singh et al., 2013). Other research, on the other hand, reported a larger female percentage (Abd-Elhaleem and Al Muqhem, 2014; Devaranavadi et al., 2017).

The majority of toxicities occurred in the home of a child, which is consistent with the findings of other studies (Azab et al., 2016; Hassan and Siam, 2014; Rodrigues et al., 2016). It has been observed that the household environment is where the child spends the most of his or her time, and it also has the largest number of poisoning accidents in the first five years of life (Elshoura et al., 2016).

The present study found that detergents and caustics were the leading causes of household child poisoning, followed by pharmaceutical medications. This is comparable to research done by (Moshtohry et al., 2018; Hassan and Siam, 2014). This could be because those compounds are sometimes the most easily accessible home products and mothers reuse water bottles as caustic container. In contrast, results from studies (Halawa et al., 2013; Dayasiri et al., 2017) identified pharmaceuticals as the leading cause of child poisoning.

In this study, the most common causes of toxicity based on participant opinions were child exploration and parental neglect. This could be explained by the fact that the majority of the children studied were under the age of six, when curiosity and exploration were more common. The negligence of families and those involved in childcare, ignorance about poisoning, packaging of produced drugs in appealing colors, release of pesticides at the lowest possible price to the market, uninformed drug use, nonprescription sale of some drugs, and leaving them within reach of children all contribute to an increase in poisonings (Sivri and OzpuLat, 2015).

Almost half of the mothers studied had moderate knowledge, and around one-third had good knowledge. In terms of the association between mothers' education and their knowledge of poisoning, highly educated mothers had a higher frequency of good knowledge. This finding was compatible with the findings of Sivri and Ozpulat (2015).

In contrast, *Lafta et al. (2013)* and *Moshtohry et al. (2018)* showed that the majority of their assessed highly educated mothers had poor knowledge on coping with household child toxicity (*Lafta et al., 2014; Moshtohry et al., 2018*).

According to the findings of this study, more than half of the participants had received no information concerning proper disposal of unused/expired pharmaceuticals. However, in Ethiopia, high percentage of respondents had strong knowledge of unused and expired drug disposal (*Kahsay et al., 2020*). This could be because healthcare practitioners there were interested in raising awareness about the potential consequences of inappropriate disposal of unused and expired medications.

When asked studied mothers about the best sources of information for safe disposal of unwanted or expired pharmaceuticals, the majority of respondents said that mass media, family, and friends were the best ways to promote awareness. These findings are in line with those of other studies (*Ayele and Mamu, 2018; Kahsay et al., 2020*). According to the current result, respondents' reasons for keeping unused medicine at home were largely for future usage and resolving disease or conditions, which is comparable with studies conducted in Ghana (*Osei-Djarbeng et al., 2015*) and Ethiopia (*Kahsay et al., 2020*).

Approximately half of the participants in this study strongly agreed that keeping unused medicine in the house is risky for children, which was also reported in previous studies (*Ayele and Mamu, 2018; Kahsay et al., 2020*).

Almost half of the participants agreed that there was insufficient information regarding how to safely dispose of unused/expired pharmaceuticals. When compared to other studies, this finding is quite similar (*Ayele and Mamu, 2018*). This result implies a lack of involvement on the part of health care professionals in raising awareness and advising consumers on correct disposal practices.

Nearly two of the participants in this research would prefer to take part in a health education program about proper disposal of unused/expired pharmaceuticals. This

outcome was in line with the results of an Ethiopian investigation (*Woldeyohanins et al., 2021*). The most often mentioned reason for not using medications in the current study was an improvement in medical condition. This finding coincides with those of Ghana (*Osei-Djarbeng et al., 2015*), and Ethiopia (*Ayele and Mamu, 2018; Kahsay et al., 2020*).

The majority of participants in this study disposed unused, unexpired prescriptions through collecting them at a drug disposal site or throwing them in the toilet or sink. While research in, Kenya (*Angi'enda and Bukachi, 2016*), and Ethiopia (*Kahsay et al., 2020*) found that discarding unused medicine in garbage bins was the most preferred disposal option, flushing in toilets was the second most preferred method. This could be due to a lack of knowledge about proper pharmaceutical disposal techniques. Regarding limitations of the study; the cross-sectional nature of the study design, in particular, prevents us from drawing causal inferences regarding the link between the chosen covariates and outcome variables across time. Furthermore, its generalizability is called into question because the study was only conducted in one location (Ismailia city).

CONCLUSION

Almost half of all children who are poisoned were poisoned by detergents and caustics. The most prevalent sources of information for studied mothers were the media, family, and friends. Regarding childhood toxicity, 51% of participants had moderate knowledge, 97.5% had a positive attitude, and 36.3% had poor practice. The practice of keeping unneeded medication at home was prevalent in the current study. Despite the fact that the majority of them are aware of the potential risk linked to its existence, there was a shortage of adequate information on safe disposal practices, and the majority of respondents noted the necessity for a system that promotes the proper disposal of unwanted medications. Most preferred ways in this study for disposing of unused drugs were not recommended method.

RECOMMENDATIONS

- Educating mothers in primary health care units and outpatient clinics about

household poisoning avoidance, home accidents, and first aid management.

- Raising public awareness about the proper disposal of unused and expired medication correctly is required to prevent related toxicity.

ACKNOWLEDGEMENTS

The authors would like to thank all mothers who participated in this study.

Author contribution

Shaimaa A. Shehata: Conceptualization, Methodology, Investigation, Writing-Original draft preparation, Writing - Review and Editing. **Hebatalla M. Aly:** Conceptualization, Methodology, Validation, Formal analysis, Writing - Original Draft, **Shrouk Mohamed Ali:** accessed and verified the underlying data, Writing- Original draft preparation, Writing - Review and Editing. **Mohamed A Badr:** Methodology, Investigation. **Khadiga M. Abdelrahman:** Conceptualization, Methodology, Investigation, Writing- Original draft preparation, Writing - Review and Editing. All authors reviewed and approved the final paper draft.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflict of interest:

The authors declare that they have no competing interests.

Funding:

No funding was received to assist with the preparation of this manuscript.

REFERENCES

1. **Abd-Elhaleem, Z. A. E. and Al Muqhem, B. (2014):** Pattern of acute poisoning in Al Majmaah region, Saudi Arabia. *Am. J. Clin. Exp. Med.*, 2(4): 79–85.
2. **Abo, M., Moshtohry, B.; Mohamed, A. and Kunswa, M. (2021):** Effect of guiding program on mothers' health awareness regarding household poisoning of their children less than six years old in rural areas. *IOSR J. Nurs. Health Sci.*, 7(4): 75–88.
<https://doi.org/10.9790/1959-0704037588>
3. **Abu El-Naga, M.; Ali, S.; Ali, M. et al. (2022):** Pattern of acute poisoning among pediatric patients admitted to poison control center of Ain Shams University Hospitals. *Ain Shams J. Foren. Med. Clin. Toxicol.*, 39(2): 1–11.
4. **Adedeji-Adenola, H.; Adesina, A.; Obon, M.; Onedo, T.; Okafor, G. U.; Longe, M. and Oyawole, M. (2022):** Knowledge, perception and practice of pharmaceutical waste disposal among the public in Lagos State, Nigeria. *Pan Afric. Med. J.*, 42: 106.
<https://doi.org/10.11604/pamj.2022.42.106.34529>
5. **Aggarwal, B.; Rana, S. K. and Chhavi, N. (2014):** Pattern of poisoning in children, an experience from a teaching hospital in Northern India. *J.K. Sci.*, 16(4): 174.
6. **Ahmed, A.; AlJamal, A. N.; Mohamed Ibrahim, M. I.; Salameh, K.; AlYafei, K.; Zaineh, S. A. and Adheir, F. S. S. (2015):** Poisoning emergency visits among children: A 3-year retrospective study in Qatar. *B.M.C. Ped.*, 15:104.
<https://doi.org/10.1186/s12887-015-0423-7>
7. **Al-Johani, A. A. S.; Sabor, S. and Aldubai, S. A. R. (2018):** Knowledge and practice of first aid among parents attending primary health care centers in Madinah City, Saudi Arabia, A cross sectional study. *J.Fam. Med.Prim.Care*, 7(2): 380–388.
https://doi.org/10.4103/jfmpc.jfmpc_64_18
8. **Alruwaili, M. M.; Ramadan, O. and Shaban, M. (2022):** Predictors of unintentional poisoning exposure in preschool children: A Case-Control Study. *J. Positive School Psychol.*, 6(8): 8.
9. **Alshahrani, M. M.; Albogami, H. A.; Asiri, A. A. et al. (2023).** Epidemiological trends of acute chemical poisoning among children over a recent three-year period in Saudi Arabia. *Children*, 10(2):2.
<https://doi.org/10.3390/children10020295>
10. **Alssageer, M. A.; Arefa, K. A. and Ibrahim, E. A. (2022):** Public perception and behavior on the disposal of unused and expired drugs. *Mediterran. J. Pharm. Pharmaceut. Sci.*, 2(4): 94-105.
11. **Alwan, I. A.; Brhaish, A. S.; Awadh, A. I.; et al. (2022):** Poisoning among children in Malaysia: A 10-years retrospective study. *PLoS ONE*, 17(4): e0266767.
<https://doi.org/10.1371/0266767>
12. **Amoabeng, I. A.; Otoo, B. A.; Darko, G. and Borquaye, L. S. (2022):** Disposal of unused and expired medicines within the sunyani municipality of Ghana: A cross-sectional survey. *J. Env. Pub. Health*, e6113346.
<https://doi.org/10.1155/2022/6113346>
13. **Angi'enda, S. A. and Bukachi, S. A. (2016):** Household knowledge and perceptions on disposal practices of unused medicines in

- Kenya. *J. Anthropol. Archaeol.*, 4(2). <https://doi.org/10.15640/jaa.v4n2a1>
14. **Ayele, Y. and Mamu, M. (2018):** Assessment of knowledge, attitude and practice towards disposal of unused and expired pharmaceuticals among community in Harar city, Eastern Ethiopia. *J. Pharmaceut. Policy Pract.*, 11: 1–7.
 15. **Azab, S. M. S.; Hirshon, J. M.; Hirshon, J. M. et al. (2016):** Epidemiology of acute poisoning in children presenting to the poisoning treatment center at Ain Shams University in Cairo, Egypt, 2009-2013. *Clin. Toxicol.*, 54(1): 20–26. <https://doi.org/10.3109/15563650.2015.1112014>
 16. **Bandyopadhyay, A. and Mandal, P. K. (2017):** Clinical profile and outcome of acute poisoning in children and adolescent in a tertiary care center. *Asian J. Med. Sci.*, 8(3): 3. <https://doi.org/10.3126/ajms.v8i3.16111>
 17. **Dawson, B. and Trapp, R. G. (2004):** Basic and clinical biostatistics. In *Basic and Clinical Biostatistics*, pp. 438–438.
 18. **Dayasiri, M., Jayamanne, S. F. and Jayasinghe, C. Y. (2017):** Risk factors for acute unintentional poisoning among children aged 1–5 years in the rural community of Sri Lanka. *Inter. J. Pediatr.*, 2017:1-7. <https://doi.org/10.1155.2017/4375987>.
 19. **Devaranavadi, R. A.; Patel, S. and Shankar, P. (2017):** A study on profile of poisoning in pediatric population. *Int. J. Contemp. Ped.*, 4(3): 810–815.
 20. **El Seifi, O. S.; Mortada, E. M. and Abdo, N. M. (2018a):** Effect of community-based intervention on knowledge, attitude, and self-efficacy toward home injuries among Egyptian rural mothers having preschool children. *PLoS ONE*, 13(6): e0198964. <https://doi.org/10.1371/journal.pone.0198964>
 21. **El Seifi, O. S.; Mortada, E. M. and Abdo, N. M. (2018b):** Effect of community-based intervention on knowledge, attitude, and self-efficacy toward home injuries among Egyptian rural mothers having preschool children. *PloS One*, 13(6): e0198964.
 22. **Elshoura, A.; M Sherif, M.; Noor El-Deen, T. et al. (2016):** Assessment of acute poisoning among children in Damietta governorate. *Al-Azhar Med. J.*, 45(3): 631–644.
 23. **Farag, A. A.; Said, E. and Fakher, H. M. (2020):** Pattern of acute pediatric poisoning at Banha poisoning control center, Egypt: One-Year Prospective Study. *Asia Pacific J. Med. Toxicol.*, 9(2): 44–51.
 24. **González Peña, O. I.; López Zavala, M. Á. and Cabral Ruelas, H. (2021).** Pharmaceuticals market, consumption trends and disease incidence are Not driving the pharmaceutical research on water and wastewater. *Inter.J. Environ. Res. Public Health*, 18(5): 2532. <https://doi.org/10.3390/ijerph18052532>
 25. **Gummin, D. D.; Mowry, J. B.; Beuhler, M. C., et al. (2021):** 2020 Annual report of the American Association of poison control centers' national poison data system (NPDS): 38th annual report. *Clin. Toxicol.*, 59(12): 1282–1501. <https://doi.org/10.1080/15563650.2021.1989785>
 26. **Halawa, H.; Nageeb, S. and El Guindi, M. (2013):** Annual report of the poison control centre, Ain Shams University Hospitals, Cairo, Egypt, 2012. *Ain Shams J. Forensic. Med. Clin. Toxicol.*, 21(2): 27–34.
 27. **Hassan, B. A. and Siam, M. G. (2014):** Patterns of acute poisoning in childhood in Zagazig, Egypt: An epidemiological study. *Inter.Schol. Res. Notices*.
 28. **Kahsay, H.; Ahmedin, M.; Kebede, B. et al. (2020):** Assessment of knowledge, attitude, and disposal practice of unused and expired pharmaceuticals in community of Adigrat City, Northern Ethiopia. *J. Environ. Public Health*, 6725423. <https://doi.org/10.1155/2020/6725423>
 29. **Kayode-Afolayan, S. D.; Ahuekwe, E. F. and Nwinyi, O. C. (2022):** Impacts of pharmaceutical effluents on aquatic ecosystems. *Scie. Afric.*, 17: e01288. <https://doi.org/10.1016/j.sciaf.2022.e01288>
 30. **Lafta, R. K.; Al-Shatari, S. A. and Abass, S. (2014):** Mothers' knowledge of domestic accident prevention involving children in Baghdad City. *Qatar Med. J.*, 2013(2): 17. <https://doi.org/10.5339/qmj.2013.17>
 31. **Law, A. V.; Sakharkar, P.; Zargarzadeh, A. et al., (2015):** Taking stock of medication wastage: Unused medications in US households. *Res. Social Admin. Pharm., RSAP*, 11(4): 571–578. <https://doi.org/10.1016/j.sapharm.2014.10.003>
 32. **Lorenzo, C.; Azevedo, S.; Lopes, J. et al. (2022):** Battery Ingestion in Children, an Ongoing Challenge: Recent Experience of a Tertiary Center. *Front. Ped.*, 10.

- <https://www.frontiersin.org/articles/10.3389/fped.2022.848092>
33. **Makki, M.; Hassali, M. A. A.; Awaisu, A. et al., (2021):** Development, translation, and validation of a bilingual questionnaire on unused medications in homes. *Saudi Pharmaceuti. J.*, 29(7): 648–655.
 34. **Moshtohry, M.; Mohamed, A. and Kunswa, M. (2018):** Effect of guiding program on mothers' health awareness regarding household poisoning of their children less than six years old in rural areas. *IOSR J. Nurs. Health Sci.*, 7(4): 75–88.
 35. **Nageh, H. M.; El-Raouf, S. E. A. and El-Mouty, S. M. A. (2020):** Mothers' knowledge and subjective practice toward most common domestic injuries among under-five children. *Mansoura Nurs. J.*, 7(1): 19-35.
 36. **Naser, A. Y.; Amara, N.; Dagash, A. and Naddaf, A. (2021):** Medications disposal and medications storage in Jordan: A cross-sectional study. *Inter. J. Clin. Pract.*, 75(3): e13822. <https://doi.org/10.1111/ijcp.13822>
 37. **Nistor, N.; Frasinariu, O. E.; Rugină, A. et al. (2018):** Epidemiological study on accidental poisonings in children from Northeast Romania. *Med.*, 97(29): e11469. <https://doi.org/10.1097/MD.00000000000011469>
 38. **Osei-Djarbeng, S. N.; Larbi, G. O.; Abdul-Rahman, R. et al. (2015):** Household acquisition of medicines and disposal of expired and unused medicines at two suburbs (Bohyen and Kaase) in Kumasi – Ghana. *Pharma Innov. J.*, 4(8): 85–88.
 39. **Peshin, S. S. and Gupta, Y. K. (2018):** Poisoning due to household products: A ten years retrospective analysis of telephone calls to the national poisons information centre, all India Institute of Medical Sciences, New Delhi, India. *J. Forensic Legal Med.*, 58: 205–211. <https://doi.org/10.1016/j.jflm.2018.07.005>
 40. **Rajapakse, T., Griffiths, K. M., and Christensen, H. (2013):** Characteristics of non-fatal self-poisoning in Sri Lanka: A systematic review. *BMC Public Health*, 13: 1–15.
 41. **Rodrigues, D.; Menezes, M.; Almeida, M.; and Santos, D. (2016):** Acute poisoning in children in Bahia, Brazil. *Global Ped. Health*, 3: 1–7.
 42. **Singh, S. P.; Aggarwal, A. D.; Oberoi, S. S. et al. (2013):** Study of poisoning trends in north India—a perspective in relation to world statistics. *J. Forensic Legal Med.*, 20(1): 14–18.
 43. **Sivri, B. B. and OzpuLat, F. (2015):** Mothers' knowledge levels related to poisoning. *Turkish J. Emerg. Med.*, 15(1): 13–22.
 44. **SPSS, I. (2015):** IBM SPSS statistics for windows, version 23.0. Armonk: IBM Corp.
 45. **Teni, F. S.; Surur, A. S.; Belay, A. et al. (2017):** A household survey of medicine storage practices in Gondar town, northwestern Ethiopia. *BMC Public Health*, 17: 238. <https://doi.org/10.1186/s12889-017-4152-8>
 46. **Varghese, P. and Erickson, T. B. (2022):** Pesticide poisoning among children in India: The need for an urgent solution. *Global Ped. Health*, 9. <https://doi.org/10.1177/2333794X221086577>
 47. **Woldeyohanins, A. E.; Adugna, M.; Mihret, T. and Kifle, Z. D. (2021):** Knowledge, Attitude, and Practices of Unused Medications Disposal among Patients Visiting Public Health Centers in Gondar Town, Ethiopia: A Cross-Sectional Study. *J. Environ. Public Health*, e5074380. <https://doi.org/10.1155/2021/5074380>

المعرفة، الاتجاه و الممارسة بين الأمهات تجاه تسمم الأطفال المنزلي والأدوية الغير مستخدمة: الاسماعيلية، مصر

شيماء أحمد على شحاته^١، هبة الله محمد على^٢، شروق محمد محمد على^١،

محمد أحمد بدر^٣، خديجة محمد أحمد عبد الرحمن^١

^١قسم الطب الشرعي والسموم الاكلينيكية- كلية الطب البشرى- جامعة قناة السويس- مصر

^٢قسم طب الصحة العامة وطب المجتمع والبيئة وطب الصناعات - كلية الطب البشرى- جامعة قناة السويس- مصر

^٣مستشفيات جامعة قناة السويس- جامعة قناة السويس- مصر

الملخص العربى

المقدمة: تسمم الأطفال هو في الأساس غير مقصود ويمكن أن يحدث بسبب أدوية تستخدم لأغراض علاجية أو أغراض غير علاجية. يلعب التخلص غير السليم من الأدوية المستعملة والغير مستخدمة دورًا هامًا في زيادة معدل التسمم في الأطفال.

الهدف من البحث: هدفت الدراسة إلى تقييم وتحسين معرفة الأمهات واتجاهاتهن وممارساتهن تجاه السموم المنزلية والأدوية المستعملة والغير مستخدمة وكيفية تعاملهن معها، مما يمكن أن يمنع أو يقلل من الوفيات والأمراض لدى الأطفال.

طرق البحث: هذه دراسة عرضية جمعت عينة من الأمهات المترددات على عيادة طب الأطفال أو قسم الطوارئ أو قسم الداخلي في مستشفى جامعة قناة السويس التعليمي. أجريت الدراسة في الفترة من يوليو ٢٠٢٢ إلى سبتمبر ٢٠٢٢. وكانت الدراسة باستخدام استبيان يشمل البيانات الاجتماعية والديموغرافية و اسئلة حول المعرفة والاتجاه والممارسات فيما يتعلق بتسمم الأطفال في المنزل والأدوية المستعملة والغير مستخدمة أو الأدوية منتهية الصلاحية.

النتائج: تم تسجيل مائة وسبعة وخمسين مشاركة في الدراسة. كان متوسط أعمار المشاركات 33.6 ± 8.5 سنة، وكان ٤٥% منهن ربات منزل، وكان ٧١% من المشاركات حاصلات على تعليم عالي. وما يقرب من ربع الأمهات أقروا بأن أطفالهن قد تعرضوا بالفعل لحوادث تسمم. وكانت المنظفات والمواد الكاوية هي العوامل السامة التي تسببت في حوالي ٤٧% من الحالات. وقد كان لدى ٥١% من المشاركات معرفة متوسطة تجاه موضوع البحث، و ٣٦.٣% كان لديهن ممارسات سيئة. لم يتلق أكثر من نصف المشاركات أي معلومات حول كيفية التخلص الآمن من الأدوية الغير مستخدمة أو منتهية الصلاحية.

الخلاصة: كان لدى معظم الأمهات في هذه الدراسة اتجاه إيجابي نحو التعامل مع تسمم الأطفال بينما كان هناك نقص في المعلومات الكافية حول الممارسات الآمنة للتخلص من الأدوية.