ROLE OF POISON SEVERITY SCORE AND MODIFIED EARLY WARNING SCORE IN EVALUATING THE OUTCOME OF CHILDREN WITH ACUTE UNINTENTIONAL POISONING IN CHILDREN BELOW SEVEN YEARS OLD

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ABSTRACT

Background: Pediatric unintentional poisoning below seven years old is considered a significant public health issue. In toddlers and babies, poisoning always occurs accidentally as a result of their curiosity and like putting objects in their mouths. **Aim:** This study aimed to focus on the topic of unintentional poisoning among children younger than seven years old. The admission date to the Menoufia Poison Control Center (MPCC) were ranged from first of January 2022 to the end of December 2022. Evaluate prevalence of different types of poisoning. Analyses of sociodemographic data, circumstances, investigations, and management. Poisoning severity score (PSS) and modified early warning score (MEWS) are utilized for evaluating the seriousness and results of cases. **Patients, materials, and methods**: Clinical sheets created specifically for this purpose were gathered to collect data, including social and demographic data (age, sex, and residence), type of poisons, route of administration, clinical presentation, general examination, and investigation, evaluation of the case by PSS and MEWS, outcome, and time of discharge. **Results:** The study's findings demonstrated that 594 patients were hospitalized overall during the research period with a greater percentage of male cases than female cases. The most affected age group was 2 – 5 years old and from rural regions. The most prevalent type of poisoning was pesticides followed by bleaching and drugs. Considering the place of exposure, 92.1% of cases were at home. The oral route was the most frequently mode of poisoning. As regards outcome 66% of cases were improved and dead cases constituted 8.6%. Regarding PSS, the vast majority of cases were mild and moderate. Regarding MEWS low and mild cases were the majority. **Conclusion and recommendations**: Most of the poisonings were due to ingestions. Pesticides and medications were most commonly reported toxic agents in all age groups with a mortality rate of 8.6%.

PSS and MEWS were good prognostic markers to predict acute poisoning in children including the degree of special care required, severity of a patient's illness, and the necessity for ICU hospitalization.

Keywords: acute unintentional poison, children below 7 years, Menoufiya, PSS, MEWS.

INTRODUCTION

Children's morbidity and death are frequently attributed to poisoning; about 2% of fatalities were linked to unintentional poisoning in developing countries, (**Molla et al.,** 2022). Acute poisoning had increased in frequency during the past few years in all countries. This makes poisoning problem in children very likely to get much worse (**Ahmed et al., 2011**).

Poisoning patterns have shifted as a result of the presence of new dangerous items, an increased risk of child exposure, and an increase in new consumer products.

Pediatric unintentional poisoning among Preschool Children in Jeddah is

considered a serious public health problem. It is the result of a complicated interplay between children and dangerous substances. **(Salem et al., 2021**).

In toddlers and babies, poisoning always happens unintentionally as a result of their curiosity and enjoyment of putting objects in their mouths **(Ahmadabadi et al.**, **2016).** There are other additional variables, such as the unsafe storage of poisonous substances. Lack of supervision from parents or other caregivers, combined with unorganized family dynamics, can lead to children ingesting toxic substances, which can result in accidents and poisoning that can have fatal outcomes **(Abed et al., 2022**). Thousands of kids who have accidentally ingested poisons are admitted to poisoning centers each year. There are significant costs involved in solving this challenge of global health. The type and amount of the toxin, age of the patient, and manner of exposure all have an impact on the type of poisoning **(Ragab and Al-Mazroua, 2015)**.

AIM OF THE WORK

The primary objective of this study was to focus on the problem of unintentional poisoning in children who are younger than seven years old. Because below this age, child is not responsible for his act, as he does not understand the nature and consequences of the act **(Biswas, 2016).**

Children were admitted to Menoufiya Poison Control Center (MPCC) between first of January 2022 to the end of December 2022. Evaluate the prevalence of different types of poisoning. Analyses of socio-demographic data, circumstances, investigations, and management. The Poisoning severity score (PSS) and the modified early warning score (MEWS) are used for assessment the severity and results of cases.

PATIENTS, MATERIAL AND METHODS

A prospective study was conducted on unintentionally poisoned children who met the inclusion criteria and were received treatment in the Menoufia Poison Control Center (MPCC) between first of January 2022 to the end of December 2022. Inclusion criteria include all cases with accidental poisoning and age was less than seven years.

Exclusion criteria: cases of acute food poisoning or suspected violence were excluded. Also, any case with a history of health problem, such as heart disease, kidney failure or asthma was excluded as it may result in more complications and deterioration.

The Research Ethics Committee of Menoufia Faculty of Medicine and the Forensic Medicine and Clinical Toxicology Department approved the study, granted approval number (IRB3/2023FORE7), and the Declaration of Helsinki and National Guidelines were followed. After outlining the aim of the study, the guardians of the patients provided signed informed consent. To protect privacy, patient's data were kept anonymous. Clinical sheets created and contained data collection such as sociodemographic information (age, sex, and residence), circumstances, type of poisons, route of administration, clinical presentation, general examination, and investigation, evaluation of the case by PSS and MEWS, outcome, and time of discharge.

According to **Persson et al., (1998),** there are four categories for poisoning grades according to the Poison Severity Score (PSS). None (0): no symptoms or signs relative to poisoning, minor (1): mild, transient and continuously relieved symptoms, moderate (2): persistent symptoms, severe (3): severe or life-threatening symptoms, fatal (4): death.

Modified Early Warning Score (MEWS) **(Rong et al., 2019**) can indicate the severity of a patient's condition, determine the degree of special care, and determine whether an ICU admission is necessary or not. MEWS includes physiological parameters such as heat rate, respiration, body temperature, systolic blood pressure and consciousness. All of these parameters must be included to give an accurate MEWS score. During the assessment, the optimal parameter score

was determined based on the actual value of each parameter **(Table 1)**. Finally the total score was calculated by adding the score values of the five items. Normal = MEWS 0 to 1. LOW =MEWS 2 to 3. MEDIUM = MEWS 4 to 6, HIGH = MEWS 7 to 8. Critical = >8.

To preserve data confidentiality and avoid conflicts of interest, all information were kept anonymous.

Table (1): Modified Early Warning Scoring System. **(Rong et al., 2019)**

	3	2	1	0	1	2	3
Heart rate		≤40	41-50	51-100	101-110	111-129	≥130
Systolic blood pressure	<70	71-80	81-100	101-159	160-199	200-220	>220
Respiratory rate		≤7	8	9-17	18-20	21-29	≥30
Temprature		<95f	95-96.8f	96.9-100.4f	100.5-101.3	≥101.4f	
Conscious level	unresponsive	Respond to pain	Respond to verbal	alert	New agitation New confusion		

Statistical Analysis

The data was tabulated and statistically analyzed using the Statistical Package for the Social Sciences (SPSS) Version 16.0 for Windows. The statistical analysis and calculations were conducted by **Dawson and Trapp 2001**.

Categorical data, which were represented as percentages and numbers, are compared using the chi square test. Alternatively, Monte Carlo correction test was applied when more than 20% of the cells have expected count less than 5. P-values are classified as significant when they are 0.05 or less, highly significant when they are 0.01 or less, and non-significant when they are greater than 0.05. Kappa test for agreement was used. Level of agreement poor agreement < 0.20, fair agreement 0.21 – 0.40, Moderate agreement 0.41 – 0.60, good agreement 0.61 – 0.80 and very good agreement 0.81 – 1.0.

RESULTS

Table 2: According to this study, 594 patients were admitted throughout the study period, and there were more male cases than female cases (51.3% versus 48.7%, respectively). The age group most affected was 2–5 years old (56.1%). As regards residence, most cases were from ruler areas (83.0%). Considering the place of exposure to poisoning, 92.1% of cases were at home. Regarding the time elapsed between poison exposures and reaching to hospital, the majority of cases reach PCC within 1-6 hours (65.7%).

Table 2: Percentage distribution of poisoned cases as regard sociodemographic data (No 594)

Variable	No. (%)
Sex	
Male	305 (51.3%)
Female	289 (48.7%)
Age	
0 – <2	126 (21.2%)
2 – 5	333 (56.1%)
≥5 < 7	135 (22.7%)
Mean ± SD.	3.19 ± 1.78
Median (Min. – Max.)	3.0 (0.75 – 9.0)
Residence	
Ruler	493 (83.0%)
Urban	101 (17.0%)
Place of exposure	
Home	547 (92.1%)
Street	21 (3.5%)
Farm	26 (4.4%)
Delay time	
<1hr	122 (20.5%)
>1-6hr	390 (65.7%)
>6hr	82 (13.8%)
Route of exposure	
Oral	573 (96.5%)
Inhalation	6 (1.0%)
Dermal	4 (0.7%)
Oral +dermal	7 (1.2%)
Out Come	
Improved	392(66%)
Escaped	34(5.7%)
Discharged	117(19.7%)

Dead	51(8.6%)

The oral route was the frequent mode of poisoning by (96.5%).

As regards outcome 66% of cases were improved, 9.7% of patients were discharged, dead patients constituted 8.6% and 5.7% of patients escaped.

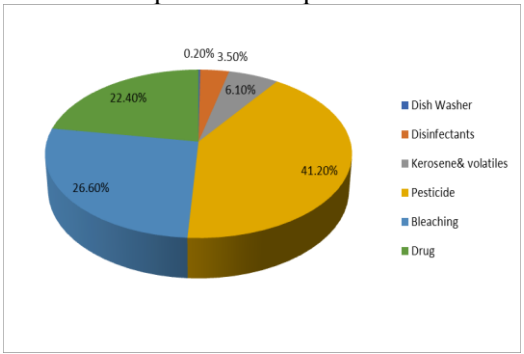

Figure (1): The type of poison and its frequency distribution in studied cases.

Figure 1 showed that the commonest type of poisoning was pesticide (41.2%). Dish Washer was the least type constituted only 0.2%.

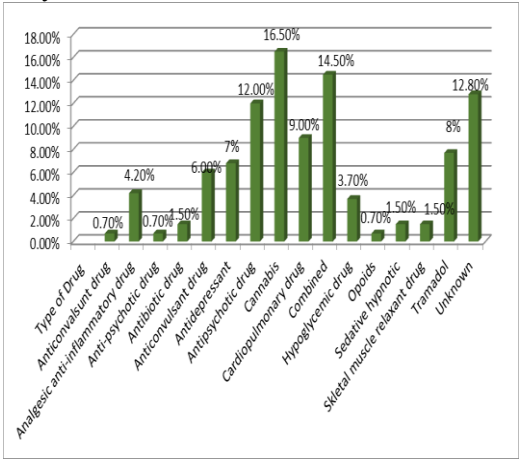

Figure (2): Frequency distribution of poisoned cases as regard type of drug (n= 133).

Figure 2 illustrated that frequency distribution of poison cases as regard type of drugs, during study we noticed that cannabis represented the most common type (16.5%).

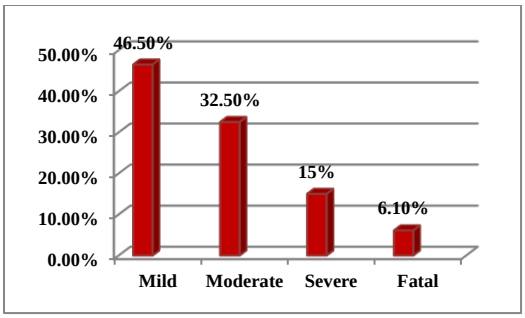

Figure (3-A): Frequency distribution of the poisoned cases according to PSS

Figure (3A) distribution of the studied cases according to PSS showed that most cases were mild (46.5%). While fatal cases were 6.1%.

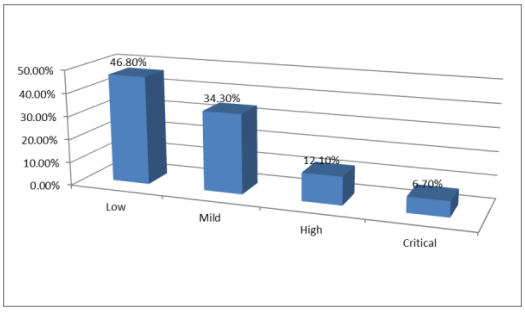

Figure (3-b): Frequency distribution of the poisoned cases according to MEWS.

Figure (3B) shows distribution of the studied cases according to MEWS, low and Mild cases were the majority (46.8%) and (34.3%) respectively.12.1% of cases were high and 6.7% of cases were critical.

Table (3): Level of agreement and value of strength between PSS and MEWS (No = 594).

	PSS				χ^2	P
	Mild (n = 276)	**Moderate (n = 193)**	**Severe (n = 89)**	**Fatal (n = 36)**		
MEWS						
Low	237 (85.9%)	28 (14.5%)	13 (14.6%)	0 (0%)		
Mild	22 (8%)	165 (85.5%)	17 (19.1%)	0 (0%)		
High	17 (6.2%)	0 (0%)	55 (61.8%)	0 (0%)	1105.193*	<0.001*
Critical	0 (0%)	0 (0%)	4 (4.5%)	36 (100%)		
κ (Level of agreement)		**0.738 (<0.001*) (good agreement)**				
% of agreement		**83.0%**				

χ^2: **Chi square test** κ: **kappa test** p: p value for association between different categories

*: Statistically significant at $p \leq 0.05$.

Table 3 shows agreement between PSS and MEWS there was a statistically significant difference between MEWS and PSS, low cases of MEWS shows 85.9%of mild cases of PSS while mild cases of MEWS show 85.5% of moderate cases of PSS and high cases of MEWS show

significance with 61.8 of severe cases while critical cases of MEWS show 100% of fatal cases of PSS. According to the strength of agreement, there is a good agreement (0.73) between MEWS and PSS.

Table (4): Statistical analysis (Chi square test) of PSS of acute poisoned cases in relation to delay time, place of exposure, duration of stay in hospital and type of poison (n = 594).

Value of κ	Strength of agreement
< 0.20	Poor
0.21 – 0.40	Fair
0.41 – 0.60	Moderate
0.61 – 0.80	Good
0.81 – 1.00	Very good

Table 4 There was a highly significant relation between place of exposure and PSS ($p \leq 0.01$) as home represented the highest value in all PSS grades. Regarding the period of stay in the hospital, there was a highly significant relation between the period of stay and PSS as ($p \leq 0.01$) as moderate and severe grades of PSS, patients stayed more than 7 days.63.2%, and 51.7% respectively while with mild grades of pss, the majority stayed 68.8% stayed at the hospital 1-3 days. The majority of fatal cases (52.8%) stayed from 4-7 days. Regarding type of poison, there was highly significant relation between pss and type of poison ($p \leq 0.01$): Bleaching agents represented the highest poison in mild and moderate cases showing 33% and 34.7% while pesticides were the highest poison in all severe and fatal severity scores represented 96.6% and 100% respectively.

Table (5): Statistical analysis (Chi square test) of MEWS of acute poisoned cases in relation to delay time, place of exposure, duration of stay in hospital and type of poison (No = 594).

	PSS				χ^2	
	Mild (n = 276)	**Moderate (n = 193)**	**Severe (n = 89)**	**Fatal (n = 36)**		
Delay time						
<1hr.	57 (20.7%)	39 (20.2%)	22 (24.7%)	4 (11.1%)		
>1 –6hr.	180 (65.2%)	126 (65.3%)	56 (62.9%)	28 (77.8%)	3.661	0.723
> 6hr.	39 (14.1%)	28 (14.5%)	11 (12.4%)	4 (11.1%)		
Place of exposure						
Home	262 (94.9%)	185 (95.9%)	65 (73.0%)	35 (97.2%)		
Street	8 (2.9%)	8 (4.1%)	4 (4.5%)	1 (2.8%)	57.048*	^{MC}p <0.001*
Farm	6 (2.2%)	0 (0%)	20 (22.5%)	0 (0%)		
Period of stay in hospital						
1-3)	190 (68.8%)	67 (34.7%)	21 (23.6%)	15 (41.7%)	194.673*	^{MC}p <0.001*
4-7)	46 (16.7%)	4 (2.1%)	22 (24.7%)	19 (52.8%)		
(More 7 days)	40 (14.5%)	122 (63.2%)	46 (51.7%)	2 (5.6%)		
Type of poison						
Dish Washer	1 (0.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)		
Disinfectants	11 (4.0%)	10 (5.2%)	0 (0.0%)	0 (0.0%)		
Kerosene and other volatiles	28(10.1%)	7 (3.7%)	1 (1.1%)	0 (0.0%)		
Pesticide	75 (27.2%)	48 (24.9%)	86 (96.6%)	36 (100.0%)	231.981*	^{MC}p <0.001*
Bleaching	91(33%)	67(34.7%)	0 (0.0%)	0 (0.0%)		
Drug	70(25.4%)	61(31.6%)	2(2.2%)	0 (0.0%)		

χ^2: **Chi square test** MC: **Monte Carlo** p: p value for association between different categories
*: Statistically significant at $p \leq 0.05$

Table 5 Regarding the delay time, there was no statistically significant difference between delay time (time elapsed between ingestion of poison & arrival to hospital) and MEWS. Regarding the place of exposure to MEWS there was a highly significant relation as ($p \leq 0.01$) home was the highest place of exposure showing 96.8%, 94.6%, 63.9 %, and 97.5% for the scores low, mild, high, and critical respectively. As regards the period of stay in the hospital one to three days was the highest ratio in low score cases represented 67.6%, 4-7day was the highest score in mild and high cases represented 55.9% and 65.3% ,while more than 7 days in critical cases represented 55%. Considering type of poison, bleaching agents represented highest ratio in mild cases by 32.4% while pesticides were the highest ratio in sever and critical grades of scoring in MEWS represented 81,9% and 100% respectively. The relation between the type of poison and MEWS was highly significant ($p \leq 0.01$).

Table (6): Statistical analysis (Chi square test) of age groups in relation to sex, type of poison, MEWS and PSS (No = 594).

	Age			χ^2	**P**
	0 –<2 (n = 126)	**2 –5 (n = 333)**	**≥5 < 7 (n = 135)**		
Type of poison					
Dish Washer	0 (0%)	1 (0.3%)	0 (0%)		
Disinfectants	7 (5.6%)	12 (3.6%)	2 (1.5%)		
Kerosene and volatiles	5 (4.0%)	21 (6.3%)	10 (7.4%)	59.654*	^{MC}p <0.001*
Pesticide	38 (30.2%)	125 (37.5%)	82 (60.7%)		
Bleaching	48 (38.1%)	85 (25.5%)	25 (18.5%)		
Drug	28(22.2%)	89 (26.7%)	16 (11.9%)		
Sex					
Male	58 (46%)	177 (53.2%)	70 (51.9%)	1.874	0.392
Female	68 (54%)	156 (46.8%)	65 (48.1%)		
MEWS					
Low	72 (57.1%)	153 (45.9%)	53 (39.3%)		
Medium	40 (31.7%)	120 (36.0%)	44 (32.6%)	16.023*	^{MC}p <0.001*
high	9 (7.1%)	40 (12%)	23 (17%)		
critical	5 (4%)	20 (6%)	15 (11.1%)		
PSS					
Mild	69(54.8%)	162(48.6%)	45(33.3%)		
Moderate	41(32.5%)	113(33.9%)	39(28.9%)	33.822*	^{MC}p <0.001*
Severe	11(8.7%)	39(11.7%)	39(28.9%)		
Fatal	5(4%)	19(5.7%)	12(8.9%)		

χ^2: **Chi square test** MC: **Monte Carlo** p: p value for association between different categories
*: Statistically significant at $p \leq 0.05$

Table 6 shows the relation between age with different parameters. Many risks were statistically significant as bleaching agents were the commonest poison in age groups below two years represented 38.1 % while pesticides was common in ages below five and above five represented 37.5% and 60.7%. This relation was statistically significant. in all age groups, the exposure to Pesticides were predominantly 30.2%, 37.5 and 60.7% among age groups less than 2 years, 2-<5, and 5<7 respectively. There was no significant relation between the selected age groups and sex. The relation between selected age groups and MEWS and between selected age groups and PSS was statistically highly significant as ($p \leq 0.01$) low grades were predominant in all age groups in MEWS. Mild grade was predominant in all age groups in PSS.

Table (7): Statistical analysis (Chi square test) of outcome in relation to type of poison, delay time, PSS and MEWS (No = 594).

	Outcome					
	Improved (n = 392)	**Escaped (n = 34)**	**Discharged (n = 117)**	**Dead (n = 51)**	χ^2	**p**
Type of poison						
Dish Washer	1 (0.3%)	0 (0%)	0 (0%)	0 (0%)		
Disinfectants	17 (4.3%)	0 (0%)	4 (3.4%)	0 (0%)		
Kerosene & volatiles	24 (6.1%)	4(11.8%)	8 (6.8%)	0 (0%)	167.668*	^{MC}p <0.001*
Pesticide	171 (43.6%)	2 (5.9%)	21 (17.9%)	51 (100.0%)		
Bleaching	88(22.4%)	7(20.6%)	63(53.8%)	0(0%)		
Drug	91 (23.2%)	21(61.8%)	21(18%)	0(0%)		
PSS						
Mild	203 (51.8%)	12 (35.3%)	61 (52.1%)	0 (0%)		
Moderate	120 (30.6%)	22 (64.7%)	51 (43.6%)	0 (0%)	466.326*	^{MC}p <0.001*
Severe	69 (17.6%)	0 (0%)	5 (4.3%)	15 (29.4%)		
Fatal	0 (0%)	0 (0%)	0 (0%)	36 (70.6%)		
MEWS						
Mild	206 (52.6%)	19 (55.9%)	53 (45.3%)	0 (0%)		
Moderate	130 (33.2%)	15 (44.1%)	59 (50.4%)	0 (0%)	495.945*	^{MC}p <0.001*
Severe	56 (14.3%)	0 (0%)	5 (4.3%)	11 (21.6%)		
Fatal	0 (0%)	0 (0%)	0 (0%)	40 (78.4%)		

χ^2: **Chi square test** MC: **Monte Carlo** p: p value for association between different categories
*: Statistically significant at $p \leq 0.05$

Table 7: A highly significant relation was discovered between the type of poison and outcome as pesticides constituted the majority of improved cases 43.6%.While 61.8 %of escaped cases were exposed to drug poisoning .53.8% of discharged cases were exposed to bleaching poisoning and all dead cases were exposed to pesticides poisoning. The relation between outcome and PSS was statistically highly significant as 51.8% of improved cases were mild and 52.1 % of discharged cases were also mild. 64.7% of escaped cases were moderate while 70.6% of dead cases were fatal. Regarding MEWS and outcome 52.6% of improved cases and 55.9 % of escaped cases were mild .50.4% of discharged cases were moderate and 78.4 % of dead cases were fatal. This relation was statistically highly significant ($p \leq 0.01$).

DISCUSSION

A major challenge for public health is children acute poisoning that frequently leads to hospital admissions to emergency rooms and poisoning centers.

In the current research, during the duration of the study, 594 cases were admitted to the Menoufia Poison Control Center. The total number of boys was slightly higher than that of girls (51.3% versus 48.7%).

This was in accordance with research done in various global regions and with the World Health Organization's findings that poisoning rates were generally greater in boys than in girls **(Farag et al. 2020).** His findings coincide with the research conducted by **Ahmadabadi et al. (2016),** who stated that boys are typically less obedient and more active in exploring their surroundings, which raises their liability to accidental poison exposure. This was in contrast with the results that were found by **Tallat et al. (2020)** and in a Turkish study by **Kesapli, (2018)** they noticed female predominance. However others, reported no variations by gender in the risk of poisoning **(Salem et al 2021)**.

In the present research, the age group most afflicted by acute unintentional poisoning was 2–5 years (56.1%), then

those aged ≥5< 7 (22.7%) and less than 2 years (21.2%). This nearly matches the results of a study done in **2021** by **Salem et al. that** concluded the group aged 2-4 years had the highest risk of acute accidental poisoning (51.0%). Additionally, research conducted in 2020 at Banha Poisoning Control Center revealed that the highest number of cases were at (2-6 years old) (**Farag et al. 2020).** Poisoning is most commonly seen in children of this age category, because of their natural curiosity, ignorance of potential threats, and exploratory behavior. They make mistakes all the time, especially when they put chemicals or bright things in their mouths. These results are in aligning with international studies. **(Suting et al. 2021).**

According to a residence-based study, there are more cases from rural areas (83.0%) than from towns and cities (17.0%). These outcomes corresponded with **Agarwal et al., (2016).** In addition to a harsh lifestyle and a higher prevalence of poisons in the house or in farms, rural communities also have higher rates of parental neglect to their children. This outcome differed from what **Farag et al., (2020),** had observed. They explained that poisoning incidents were more common in cities than in rural areas. This might happen because of the study's selected area, which is primarily urban and has a different nature.

Oral toxicity was the most frequent method of poisoning (96.5%).Oral intake is identified as the first route of acute poisoning. This could be because of the ease of consumption of the toxic agents orally as compared to other routes.

The most noticeable risk factor for ingestion is the presence of a substance in the child's hands at home. Young children often put objects in their mouths to explore what they find in their surroundings, and additionally placing hazardous materials in non-original containers, which raises the risk of accidental poisoning (**Farag et al. 2020).** Our findings corroborated those of multiple researches, including one by **Brilli et al. (2023),** which discovered that 93% of cases were obtained orally.

Homes were accountable for the bulk of unintentional child poisoning incidents (92.1%). Studies performed in the PCC of the Careggi University Hospital in Florence, Italy by **Brilli et al., (2023**) proved the same results and explained that by the unsuitable storage of chemicals and pesticides at homes especially in rural areas, and the availability of hazardous products within children's reach.

PSS is an easy tool that can accurately predict mortality in acutely poisoned patients **(Persson et al 1998). MEWS** can be used to evaluate the severity of patient's condition, determine the level of special care and the necessity for ICU admission **(Rong et al 2019).**

As regards PSS most cases were classified as mild and moderate (46.5% and (32.5%) respectively. **Also in MEWS**, majority of cases (46.8%) were low and (34.3%) were mild as all studied cases were accidental and no suicide tendencies.

The results aligned with prior Indian research done by **Jose et al. (2012),** they found that the most of poisoning patients had a PSS score of 1 or 0 and in accidental poisoning, the dose is always low. On the other hand, **Alije et al, (2014),** observed that approximately 55.8% of patients in their research were classified as moderate to severe cases depending on the patients' clinical manifestations.

In light of the agreement's strength, there was a good agreement between MEWS and PSS. Combined using the PSS with MEWS might prove to be a particularly promising tool to determine more accurately the severity of a patient’s condition and whether an ICU admission is necessary.

The results demonstrated that no statistically significant association discovered between the time period of the delay and PSS and also between the time period of the delay and MEWS. The same result was obtained by **Sam et al**. (**2009),** as they noticed that the clinical outcome had not changed by this time period.

This could be explained by that, in accidental poisoning, the dose is always low (**Jose et al. 2012**).

However, when the time period of the delay increases, a poisoning severity score is expected to increase as when treatments is delayed , the poison reach its peak in the serum and produce permanent tissue damage. However, it is widely accepted that one of the most important factors that may influence survival is early intervention. (**Smythe et al., 2021)**

Oral poisoning constitutes the majority of cases. There was no significant correlation between the route of exposure and PSS or MEWS. One of the main contributing factors to parenteral carelessness may be the presence of poisonous containers or pharmaceuticals in bright colors in the surroundings of the kids. The child's curiosity and the mother's daytime absence from the home could be additional factors for childhood poisoning (**Mahmoud, 2019)**.

In the present study, a considerable correlation was discovered between the exposure area and both PSS and MEWS. Home represented the commonest place of exposure to PSS. The Majority of the cases were mild.

The same results were obtained by **Mintegi et al**., (**2006)**. Kids unintentionally swallowed liquid poisons from soft drink bottles and mineral water because they were thirsty. Moms' cleaning efforts against ants and other insects have also increased susceptibility of children for poisoning (**Mahmoud, 2019)**.

There was a significant relation between the period of stay in the hospital and PSS also with MEWS. As mild cases persisted and severe cases more than seven days while fatal cases1-3 days. The same results were found in the study by **Das et al. (2022),** they noticed that throughout the first 72 hours of hospitalization, 43.87% of the patients showed severe life-threatening symptoms (grade 3 of the poison severity score)

In comparison, the **Alazab**, (**2012)** data showed that 6.2% of cases were discharged from medical center after more than 12 hours, 26.5% of cases were discharged within 6 to 12 hours, and 67.3% of cases were discharged in less than 6 hours.

He observed that the intensity of these cases was milder and cured without any fatalities. This contrast between our study and the previous study could be because the research target age group less than five years old.

In the present research, across all ages, pesticides were shown to be the most prevalent cause of poisoning because they are widely available and can be used in a variety of ways both at home to kill insects and rodents as well as in fields. Medications and cleaning agents come next. This also highlighted the poor habit of utilizing concentrated cleaners for washing and cleaning while keeping them reachable to kids (**Kandeel and EL-Farouny, 2017)** In addition, **Aglan (2007)**, stated that among children receiving treatment in a poison control center at Ain Shams University in Cairo in 2004, chemicals and household supplies comprised the largest number of poisoning incidents (43.1%). The majority of these instances were insecticides followed by corrosives then hydrocarbons.

In accordance with his research, the second-highest number of poisoning cases (36.0%) was related to medications. Our results also agreed with the research by **Rathore (2013),** who found that consuming household products like kerosene, pesticides, disinfectants, chlorine bleach (Clorox), and unknown compounds was the leading cause of adverse health effects.

Our study showed that high correlation was seen between the age group with MEWS, and PSS as age group (less than 5) had more severe and fatal outcomes 11.1% and 18% respectively for MEWS and 12.7% & 17.4% for PSS. These results correspond to those of Solevåg **et al. (2013),** who reported that there is a link between a high MEWS and younger age groups. This could be due to the fact that younger children who are sick are being

admitted to hospitals more rapidly as they are high risk groups.

Over half (51%) of the fatalities are caused by the ingestion of pesticides.

Similar observations were reported by **Kandeel and El Feroany in 2017**, who showed that pesticides are readily available and little regulated in developing nations. A large percentage of fatal cases (86.7%) were caused by exposure to pesticides (13cases of 15) with zinc phosphide due to its high poisonous content and fast absorption. Also, according to **Zhang et al. (2013),** poisoning with pesticides has a risk of death that is more than four times higher than other poisons.

Nonetheless, studies carried out in the United Arab Emirates, showed that Children's poisoning was largely caused by medications **(Dawson et al., 1997)**. This might referred to improvements in socioeconomic state besides, changes in habits and lifestyles. In addition, the type of medication reflects the substances that are frequently utilized in each location (**Petridou et al., 1996).**

Compound therapeutic medications accounted for the second common cause of drug intake. However, **Barry, (2005),** stated that compound therapeutic medications (32.69%) were the main causes of poisoning while the pesticides coming in second. It may be due to cultural disparities between both environments.

As regards the present study, a significant number of cures have been attributed to early hospital admission and obtaining medical care (87.2% of the cured cases was at the hospital within six hours of the onset of toxicity

Similar observations were reported by **Kandeel and El Feroany in 2017** who reported that the period between ingestion and hospital admission has a major effect on the outcomes; this may be because the poison antidotes and the other early management and treatment therapies helped prevent complications. Also, **Bryant and Singer in 2003** reported that the time that has passed since the toxic substance was consumed influences the efficacy of the treatment.

The results of the examined cases showed a substantial correlation between the PSS and outcome as scores of 3 and 4 were attributed to severe and fatal toxicity, respectively, in 29.4% and 70.6% of died cases. This looks reasonable because humans are more likely to die if they have more toxicity and serious symptoms.

In the present study cannabis is extensively used among children.

Regards data from World Health Organization (WHO), cannabis is an illicit substance that is grown, transported, and used most frequently worldwide, with 2.5% of the world's population being a user. Acute intoxication in children usually arises from exploratory ingestion of marijuana intended for adult use.

Parents may intentionally expose their children to cannabis smoke through direct cannabis inhalation or oral consumption through sweets, or eating it in a raw form (**Alomari et al., 2020).**

CONCLUSIONS

The age group most affected by acute unintentional poisoning was 2–5 years. Most of the poisonings were due to ingestions. Home represented the commonest place of exposure. Pesticides and medications were most commonly reported toxic agents in all age groups. Over half of the fatalities are caused by the ingestion of pesticides. Combined using the PSS with MEWS might prove to be a particularly promising tool to determine more accurately the severity of a patient’s condition and whether an ICU admission is necessary.

RECOMMENDATIONS

Knowledge of the characteristics, epidemiological aspects, severity and prognosis of acute poisoning cases play an important role in selecting proper prevention and treatment programs. These programs should include:

a. Messages to caregivers advising them to check if child-resistant closures have been correctly re-engaged and to test them.

b. Products that may be harmful such as medicines, oven cleaners, detergents, and dishwasher machine powder should keep them out of reach of children.

c. Restrictive guidelines should be followed to control the storage, and sale of pesticides, and advice people about the precautions that should be taken while using pesticides.

d. More researches should be done to improve our knowledge of the prevalence of poisonings among children in Egypt

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الملخص العربي

دور درجة خطورة التسمم ودرجة الإنذار المبكر المعدلة في تقييم نتائج الأطفال المصابين بالتسمم الحاد غير المتعمد لدى الأطفال اقل من سبع سنوات

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يحدث التسمم دائمًا عند الأطفال الصغار والرضع دون قصد نتيجة فضولهم واستمتاعهم بوضع الأشياء في أفواههم.

الهدف من البحث: تهدف هذه الدراسة إلى تسليط الضوء على قضية التسمم غير المتعمد بين الأطفال الذين تقل أعمارهم عن سبع سنوات والذين تم إدخالهم إلى الذين تم حجزهم في مركز السموم بمستشفى جامعة المنوفية في الفترة من 1 يناير 2022 إلى 31 ديسمبر 2022 و تقييم مدى انتشار أنواع التسمم المختلفة . وتحليل البيانات الاجتماعية والديموغرافية وتقييم شدة خطوره الحالات وتم تصنيف الحالات على حسب شدة الاعراض

المرضى وطرق البحث: تم جمع البيانات في أوراق سريرية تم تطويرها لهذا الغرض بما في ذلك البيانات الديموغرافية الاجتماعية (العمر والجنس والإقامة)، والظروف، ونوع السموم، وطريقة تناول الدواء، والعرض السريري، والفحص ، وتقييم الحالات بواسطة درجة خطورة السم الي خفيف ومعتدل وشديد ومميت وأيضا تم تصنيف مصير الحالات الى أربع مجموعات (شفيت او هربت او خرجت حسب رغبتها أو توفيت).

كما تم تقييم الحالات علي درجة الانزار المبكر المعدلة الي بسيط ومتوسط وعالي وحرج.

النتائج: بلغ عدد الحالات الإجمالي خلال فترة الدراسة 594 حالة؛ كان عدد الذكور أكثر من الإناث وكانت الفئة العمرية الأكثر تأثراً هي 2 – 5 سنوات ومن المناطق الريفية. وكان أكثر أنواع التسمم شيوعاً هو المبيدات الحشرية يليها المواد المبيضه والأدوية. وبالنظر إلى مكان التعرض، فإن 92.1% من الحالات كانت في المنزل. كان التسمم عن طريق الفم هو أكثر طرق التسمم شيوعًا.

فيما يتعلق بالنتائج، تحسنت 66% من الحالات وشكلت الحالات الميتة 8.6%. وفيما يتعلق ب بـدرجة خطورة السم كانت معظم الحالات خفيفة ومعتدلة. فيما يتعلق بـدرجة الإنذار المبكر المعدلة، كانت الحالات البسيطة والمتوسطة هي الأغلبية.

الخلاصه: معظم حالات التسمم كانت عن طريق الفم. وكانت المبيدات الحشرية والأدوية هي أكثر أنواع التسمم شيوعاً في جميع الفئات العمريه. ان استخدام درجة خطورة السم أودرجة الإنذار المبكر المعدلة يؤدي إلى تحسين التشخيص الدقيق للتسمم وتحديد مدى خطورة حالة المريض ودرجة الرعاية الخاصة والحاجة إلى دخول وحدة العناية المركزة.