MALE POISONING IN ALEXANDRIA POISON CENTER: PATTERNS AND CLINICAL OUTCOME

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ABSTRACT:

Background: Poisoning remains a significant public health concern, particularly among males. This study **aimed** to investigate the pattern and outcome of poisoning among male patients admitted to Alexandria Poison Center (APC) throughout three successive years (between 2020 and 2022). **Methodology:** A retrospective observational hospital record-based study was conducted. **Results:** A total of 11777 male patients were recruited in the study. The mode of poisoning in most male patients was accidental poisoning in all years and it is accounted mainly in children. The children's main poisoning was by corrosive and hydrocarbons. Ingestion was the most common route of exposure in the three years, The most common type of poisoning cases reported was pesticides (14.13%, 18.36%, and 17.06%), followed by alcohol (14.05%, 16.69%, 15.98%)) and corrosives (11.72%, 9.48%, 10.27%) for 2020, 2021, and 2022, respectively. Unknown poisoning ranged from 16.8% to 28.63% in all years. An observed rising trend of animal envenomation, hydrocarbon and CNS poisoning was noticed throughout years. More than 80% of the admitted cases in the three years were discharged after improvement with hospitalization period ranged from 1-3 days. Complications reported among 3.61% of patients in 2020 and 2.5% in 2022. Mortality of the admitted males was the highest in 2020 (1.75%). A statistically significant relation was detected between the type of poison and the death in the three years ($P^{MC}< 0.001$) and between the circumstances of poisoning and the outcome ($P< 0.001$). The relation between the age and circumstances was statistically significant with children dominating in accidental poisoning and adults for suicidal poisoning through all the years. The relation between age and duration of hospitalization showed statistically significant difference where the adult's duration was shorter than all other age groups. **Conclusion:** The findings of this study highlight the ongoing public health challenge posed by poisoning, particularly among specific demographic groups. To effectively address this issue, it is crucial to implement targeted prevention strategies, improve access to healthcare, and raise awareness about the dangers of poisoning. Future research should explore the underlying factors contributing to poisoning incidents and evaluate the effectiveness of interventions aimed at reducing their occurrence.

Keywords: Male, Pesticides, Poisons, Retrospective Study, Outcome

INTRODUCTION

Poisoning is a term used to describe the ability of a chemical substance to cause harmful outcomes in humans. It can enter the body through various pathways, leading to harm throughout the body and in specific areas like the eyes, skin, and lungs. Accidental or inadvertent poisoning refers to intoxication caused by unintended

consumption of a drug or chemical substance or the unexplained use of drugs by children. **(Teym et al 2024)**

With the wide variability of industrial chemicals, cosmetics, toxic plants, venomous animals and approved drugs, human exposure and toxicity increase. The primary cause of poisoning is typically pesticides and pharmaceuticals. The use of pesticides in farming is a significant concern for public health in low- and middle-income nations. Drugs that impact the central nervous system are frequently used for self-infliction in developing countries. **(Robb et al 2024 and open Resources for Nursing 2023)**

Poisoning poses a significant burden to the health sector in many populations due to its contribution to mortality and morbidity. According to WHO estimates, accidental poisoning resulted in 106,683 fatalities in 2016. **(Global health estimates 2016 -WHO 2018)** In addition, Boedeker W et al (2020), reported about 385 million cases of acute accidental pesticide poisoning occur every year globally, resulting in roughly 11,000 deaths. Furthermore, pesticide self-poisoning accounts for almost 20% of suicides worldwide. **(Boedeker et al 2020 and suicide - WHO 2019)**

Occasionally, it may not be even possible to determine the primarily responsible substance for the death when more than one drug or poison are involved. Unlabeled hazardous substances, insufficient drug and chemical regulation, poor surveillance systems, lack of enforcement, and easy access to a range of drugs and chemicals are being held responsible for the increasing poisonings and difficult in determination in the causative agents in developing countries. **(Aggarwal et al 2020 and Woyessa et al 2020)**

On the other hand, a bulk of studies report an escalation in the number of deaths in men related to drug poisoning since 1993. Male poisonous deaths were reported as the biggest killer of men aged 35 to 40 years in the UK. **(Eddleston M 2000)** Lawrence et al (2023) found that from 2014 to 2020, poisoning death rates increased the most among men in USA. **(Lawrence et al 2023)**

Although the reported escalation of male poisoning related deaths, it is still an unidentified problem in some societies. Hence, the current study aimed to examine the pattern and outcome of poisoning among males admitted to APC- Egypt throughout three successive years from the start of 2020 to the end of 2022.

METHOD

A retrospective observational hospital record-based study was conducted to analyze data on 11,777 male patients admitted to in Alexandria poison center (APC). Male patients with acute poisoning admitted over a three-year period (2020 till 2022) were investigated. The main goal of this research is to assess APC data for patterns in poisoning exposure and types of poisoning during a span of 3 years. The second objective is to assess male exposure case details through APC data analysis.

DATA COLLECTION AND ANALYSIS

The data had been collected from medical records of the center. The study variables included frequency distribution of acute poisoning cases for each year according to gender, age, route of administration, circumstances of poisoning, type of poisoning, duration of hospitalizations, and the outcome.

The patients were categorized into the following age groups: Infant (from one month to one year), Child (from one year to 11 years), Adolescence (from 12 years to 18 years), Adult (from 18 to 59 years) and old age (from 60 years and above). **(Nithyashri et al 2012)** The collected data were subjected to statistical analysis and tabulation using SPSS program, version 20. Chi-square test was used to test the association between variables, we considered $P \leq 0.05$ statistically significant. **(BM SPSS 2012 and Kirkpatrick et al 2013)**

ETHICAL CONSIDERATIONS

The Institutional Review Board, faculty of medicine, Alexandria University approved the study. (IRB Number: 00012098, FWA Number:00018699, Serial protocol number: 0306507). Confidentiality of data was maintained and used only for the purpose of epidemiological analysis.

RESULTS

A total of 11777 male patients were recruited in the study throughout three successive years (from the start of 2020 to the end of 2022). Out of 7458 patients in 2020, males represented 48.28%; in 2021, the number of admitted patients was 8299, and males represented 50.33%; and in 2022, males represented 49.39% out of 6882. **(Fig.1)**

Regarding their age, it was noticed that the large number of patients were in two age groups, children and represented (32.4%) of the total cases in the studied years and adult group (54.6%)

1. Circumstances of poisoning

The mode of poisoning in the majority of male patients was accidental poisoning in all years. Suicidal poisoning was seen in 30.35%, 17.43%, and 40.28% of studied years, respectively. A statistically significant difference was detected between the three years regarding the circumstances of poisoning ($P < 0.001$). **(Table 1)**

2. Route of exposure

Ingestion was the most common route of exposure in the three years, with its highest incidence in 2020 (90.14%). Inhalational poisoning represented the second route of exposure with its highest incidence in 2022 (11.8%). A statistically significant difference was noticed between the three years regarding the exposure routes ($X2 = 76.58$, $P<0.001$). **(Fig. 2)**

3. Type of poison

Testing was carried out to identify the toxic substance in addition to the history and clinical examination whenever available. The instances in which the poisonous substance could not be definitively recognized by history and physical examination findings were classified as unknown substances (28.53%, 23.84%) in 2020 and 2021, respectively. The distribution of patients based on poison consumed is shown in **Table 2**. The most common type of poisoning cases reported overall was pesticides (14.13%, 18.36%, and 17.06%), followed by alcohol (14.05%, 16.69%, 15.98%) followed by corrosives (11.72%, 9.48%, 10.27) for 2020, 2021, and 2022, respectively. Hydrocarbon, CNS drug toxicity and animal envenomation showed a rising trend throughout the studied period **(Fig.3)**. A statistically significant difference was detected between the three years regarding the type of poison ($P<0.001$).

4. Duration of hospitalization

The duration of hospital stay in the present study ranged from 1 day to 7 days and sometimes more. More than half of the admitted males were discharged within 24 hours in 2020 and 2021. On the other hand, the highest percentage of the admitted cases during 2022 were discharged between 1 to 3 days. A statistically significant difference was detected between the three years regarding the duration of hospitalization ($P<0.001$). **(Table 3)**

5. The outcome

As shown in Table 4, the majority (>80%) of the admitted cases in the three years were discharged after improvement. Some cases necessitated transfer to other departments and the ICU. They represented 3.61% in 2020 and 2.5% in 2022. Mortality due to poisoning of the admitted males was the highest in 2020 (1.75%) and decreased to 1.41% and 1.38% in 2021 and 2022, respectively. A statistically significant difference was detected between the three years regarding the duration of hospitalization ($P<0.001$). **(Table 3)**

6. Relation between the circumstances of poisoning and the outcome

During 2020 and 2022, the highest incidence of complications and death occurred among suicidal ingestion cases; 93.61% of the cases who died during 2022 were due to suicidal ingestion compared to 79.7% in 2021 and 44.4% in 2020. On the other hand, nearly half (49.5%) of the complicated cases in 2021 were due to accidental poisoning. A statistically significant relation was detected between the circumstances of poisoning and the outcome (P< 0.001). **(Table 4)**

7. Relation between type of poison and death

A significant relation was found between mortality and the type of poison. The highest mortality rate in 2020 occurred after unknown substances (41.3%), followed by pesticides (30.2%) poisoning. On the other hand, pesticide poisoning represented the highest cause of death. Among admitted cases in 2021 (71.2%) and 2022 (87.2%). A statistically significant relation was detected between the type of poison and the death in the three years (PMC< 0.001). **(Table 5)**

8. Relation between age and circumstances of poisoning

A statistically significant relation was found between age and circumstances of poisoning. A stable pattern was noticed throughout the three years from 2020-2022, where accidental poisoning was common mainly in children followed by the adult as regard the age group. Suicide and undetermined poison were common in the adult age group. [In 2020 (X^2=1381.65, P < 0.001) in 2021 (X^2=840.37 - P < 0.001) and in 2022 (X^2=1729.44, P < 0.001)] **(Table 6)**

9. Relation between age and type of poison

A statistically significant association was found between age and the type of poison ingested. A consistent pattern emerged across the three years (2020-2022), with children predominantly exposed to corrosives and hydrocarbons, while adults were more likely to be poisoned by substances such as alcohol, pesticides, carbon monoxide, CNS medications, foodborne toxins, and animal venoms. (In 2020: X^2=629.54, P < 0.001, in 2021: X^2=829.73, P < 0.001 and in 2022: X^2=773.25, P < 0.001).

10. Relationship between age and Outcome

A statistically significant association was found between age and outcome, with improvements observed across all age groups

with p-values less than 0.001 all through the years of the study. **(Table 7)**

11. Relationship between age and duration of hospitalization

Similarly, a significant relationship existed between age and length of hospitalization. Adults were generally discharged more quickly, often within 24 hours, while other age groups had a more extended hospital stay, typically between 1-3 days. (P^{MC} < 0.001).

Table (1): Distribution of the studied males according to the circumstances (2020-2022)

Circumstances	2020		2021		2022		Test of significance
	No.	%	No.	%	No.	%	
Accidental	2030	56.37	2870	68.71	1620	47.66	
Suicidal	1093	30.35	728	17.43	1369	40.28	$X^2 = 500.46$
Food poisoning	153	4.25	177	4.24	118	3.47	P<0.001*
Unknown	325	9.03	402	9.62	292	8.59	
Total	**3601**	**100**	**4177**	**100**	**3399**	**100**	

X^2 Chi Square test

* Significant (P < 0.05)

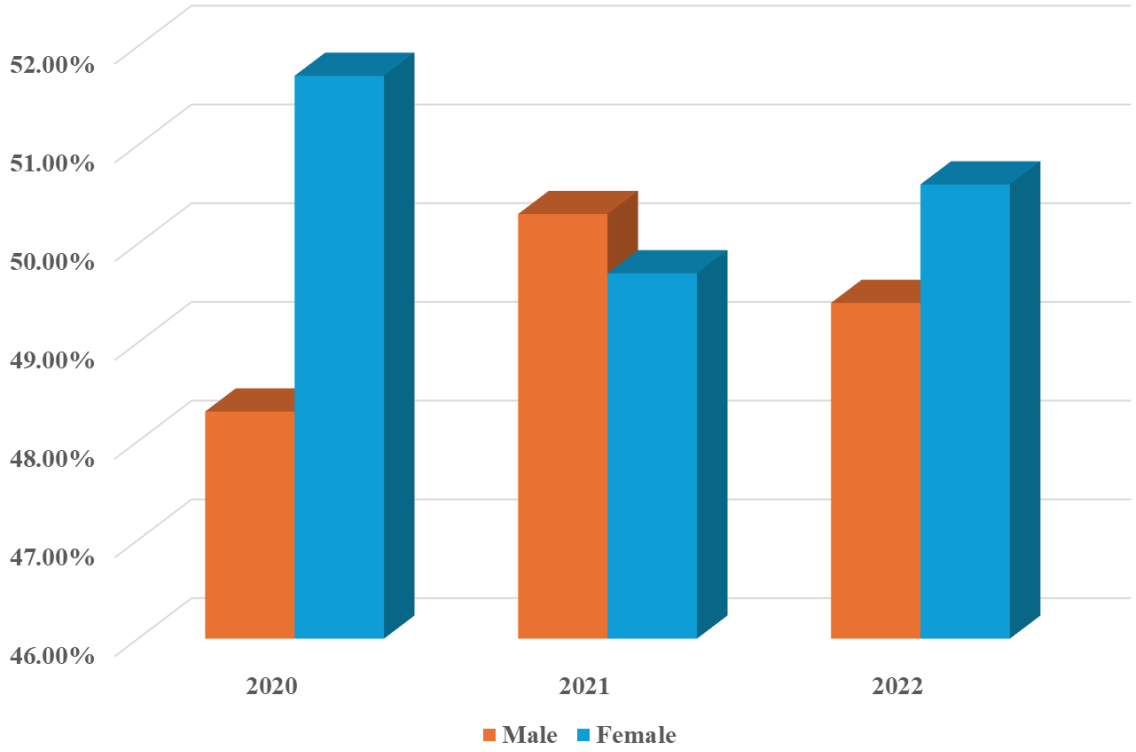

Figure 1: Distribution of the admitted cases to APC according to their gender (2020-2022)

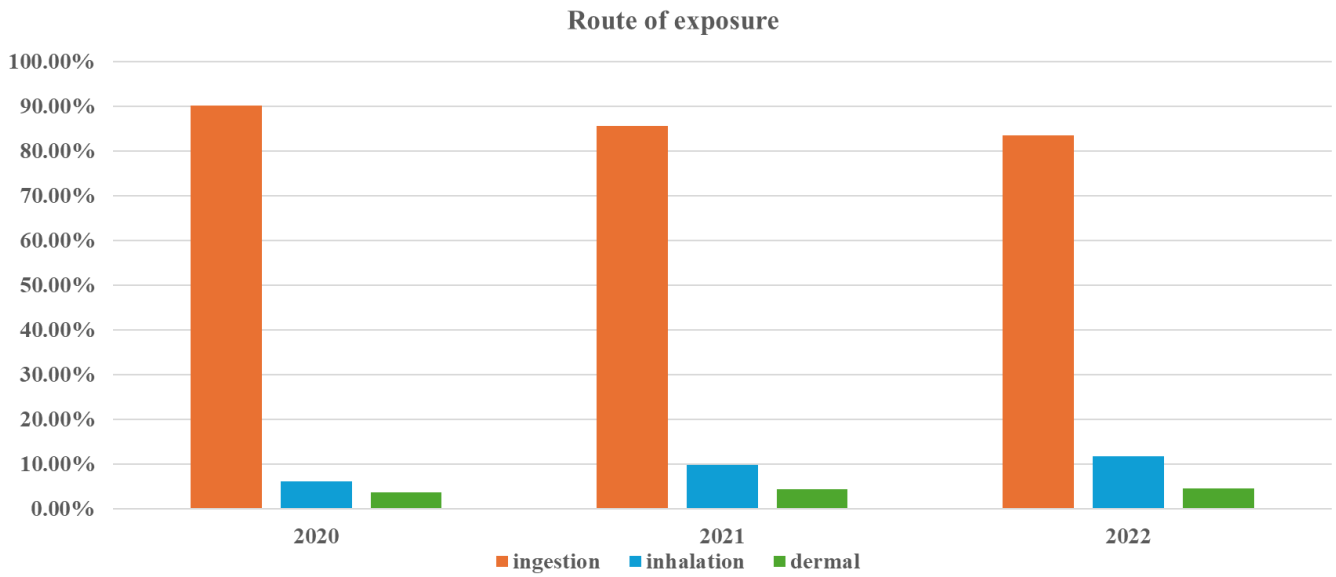

Figure 2: Distribution of the studied males according to the route of exposure (2020-2022)

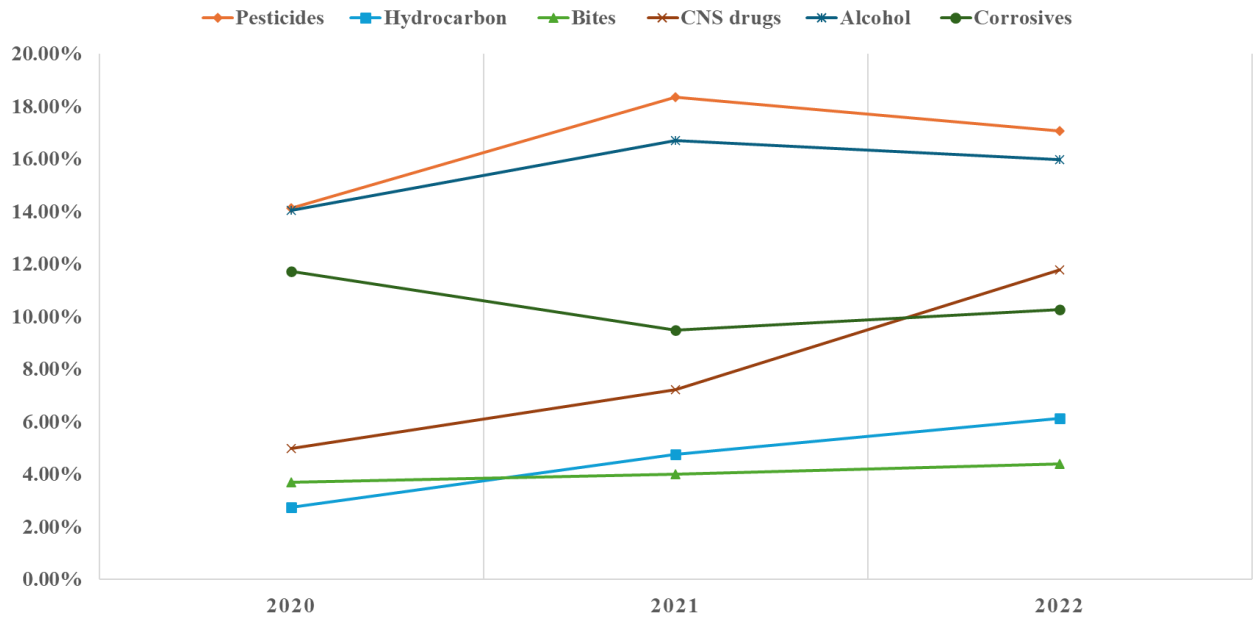

Figure 3: Trends of the commonest poisons throughout the three years (2020-2022)

Table (2): Distribution of the studied males according to the type of poison (2020-2022)

Type of poison	2020		2021		2022		Test of significance
	No.	%	No.	%	No.	%	
Alcohol	506	14.05	697	16.69	543	15.98	$X^2 = 447.8$
CNS drugs	179	4.97	302	7.23	400	11.78	P<0.001*
CVS drugs	43	1.19	36	0.86	62	1.82	
CO poisoning	173	4.80	190	4.55	221	6.50	
Pesticides	509	14.13	767	18.36	580	17.06	
Analgesics	87	2.42	65	1.56	113	3.32	
Bites	133	3.70	167	4.0	150	4.41	
Corrosives	422	11.72	396	9.48	349	10.27	
Hydrocarbon	99	2.75	199	4.76	208	6.12	
Food poisoning	153	4.25	177	4.24	118	3.47	
Others	266	7.39	185	4.43	84	2.47	
Unknown	1031	28.63	996	23.84	571	16.80	
Total	**3601**	**100**	**4177**	**100**	**3399**	**100**	

X^2 Chi Square test

* Significant (P < 0.05)

Table (3): Distribution of the studied males according to the duration of hospitalization (2020 – 2022)

	Duration of hospitalization	2020		2021		2022		Test of significance
		No.	%	No.	%	No.	%	
Duration of hospitalization	**< / = 1 day**	1983	55.07	2540	60.81	1645	48.40	$X^2 = 212.75$ P<0.001*
	>1- 3 days	1369	38.02	1490	35.67	1653	48.63	
	>3 – 7 days	170	4.72	107	2.56	67	1.97	
	>7 days	79	2.19	40	0.96	34	1.00	
	Total	**3601**	**100**	**4177**	**100**	**3399**	**100**	
Outcome	**Improved**	3117	86.56	3679	88.08	2850	83.85	$X^2 = 61.73$ P<0.001*
	Complicated	130	3.61	99	2.37	85	2.50	
	DAMA	291	8.08	340	8.14	417	12.27	
	Dead	63	1.75	59	1.41	47	1.38	
	Total	**3601**	**100**	**4177**	**100**	**3399**	**100**	

X^2 Chi Square test * Significant (P < 0.05)

DAMA: discharge against medical advice

Table (4): Relation between the circumstances of poisoning and the outcome among the studied males during (2020-2022)

		Improved		Complicated		DAMA		Death		Test of significance
		No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	
2020	**Accidental**	1764	56.6	22	16.91	218	74.9	26	41.3	X^2 = 212.75 P<0.001*
	Suicidal	949	30.4	52	40.0	64	22.0	28	44.4	
	Food poisoning	139	4.5	11	8.5	3	1	0	0.0	
	Unknown	265	8.5	45	34.6	6	2.1	9	14.3	
	Total	**3117**	**100**	**130**	**100**	**291**	**100**	**63**	**100**	
2021	**Accidental**	2603	70.8	49	49.5	210	61.8	8	13.6	X^2 = 245.185 P<0.001*
	Suicidal	551	15.0	44	44.4	86	25.3	47	79.7	
	Food poisoning	168	4.6	0	0.0	8	2.4	1	1.7	
	Unknown	357	9.7	6	6.1	36	10.6	3	5.1	
	Total	**3679**	**100**	**99**	**100**	**340**	**100**	**59**	**100**	
2022	**Accidental**	1410	49.5	26	30.6	182	43.6	2	4.3	X^2 =112.95 P<0.001*
	Suicidal	1125	39.4	40	47.0	160	38.37	44	93.6	
	Food poisoning	107	3.8	2	2.4	9	2.2	0	0.0	
	Unknown	208	7.3	17	20.0	66	15.8	1	2.1	
	Total	**2850**	**100**	**85**	**100**	**417**	**100**	**47**	**100**	

X^2 Chi Square test * Significant (P < 0.05)

Table (5): Relation between the type of poison and death among the studied males (2020-2022)

	Death (2020)				**Death (2021)**				**Death (2022)**			
	Yes		**No**		**Yes**		**No**		**Yes**		**No**	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Alcohol	3	4.8	503	14.2	1	1.7	16.9	696	0	0.0	543	16.2
CNS drugs	1	1.6	178	75.0	6	10.2	7.2	296	3	6.4	397	11.8
CVS drugs	2	3.2	41	1.2	0	0.0	0.9	36	0	0.0	62	1.8
CO poisoning	1	1.6	172	4.9	0	0.0	4.6	190	0	0.0	221	6.6
Pesticides	19	30.2	490	13.8	42	71.2	17.6	725	41	87.2	539	16.1
Analgesics	2	3.2	85	2.4	0	0.0	1.6	65	0	0.0	113	3.4
Bites	1	1.6	132	3.7	0	0.0	4.1	167	0	0.0	150	4.5
Corrosives	2	3.2	420	11.9	1	1.7	9.6	395	0	0.0	349	10.4
Hydrocarbon	0	0.0	99	2.8	0	0.0	4.8	199	1	2.1	207	6.2
Food poisoning	0	0.0	152	4.3	1	1.7	4.3	176	0	0.0	118	3.5
Others	6	9.5	261	7.4	0	0.0	4.5	185	0	0.0	84	2.5
Unknown	26	41.3	1005	28.4	8	13.6	24.0	988	2	4.3	569	17.0
Total	**63**	**100**	**3538**	**100**	**59**	**100**	**3538**	**100**	**47**	**100**	**3352**	**100**
Test of significance	**$P^{MC} < 0.001$***				**$P^{MC} < 0.001$***				**$P^{MC} < 0.001$***			

P^{MC} p value of Monte Carlo test

* Significant ($P < 0.05$)

Table (6): Relation between the age and circumstances of poisoning among the studied males (2020-2022)

		Accidental		Suicidal		Food poisoning		Unknown		Total		Test of significance
		No.	%	No.	%	No.	%	No.	%	No.	%	
2020	**Infants** (up to 1 y)	115	5.7	0	0.0	1	0.7	4	1.2	120	3.3	X^2 = 1381.65 P<0.001*
	Child (>1-12 y)	1179	58.1	14	1.3	59	38.6	22	6.8	1274	35.4	
	Adolescents (>12<18Y)	88	4.3	84	7.7	21	13.7	29	8.9	222	6.2	
	Adults (18-<65 y)	613	30.2	988	90.4	68	44.4	266	81.9	1935	53.7	
	Older adults (>65y)	35	1.7	7	0.6	4	2.6	4	1.2	50	1.4	
	Total	2030	100.0	1093	100.0	153	100.0	325	100.0	3601	100.0	
2021	**Infants** (up to 1 y)	124	4.3	0	0.0	1	0.6	0	0.0	125	3.0	X^2 = 840.37 P<0.001*
	Child (>1-12 y)	1283	44.7	3	0.4	56	31.6	11	2.7	1353	32.4	
	Adolescents (>12<18Y)	150	5.2	103	14.1	22	12.4	32	8.0	307	7.3	
	Adults (18-<65 y)	1244	43.3	598	82.1	94	53.1	346	86.1	2282	54.6	
	Older adults (>65y)	69	2.4	24	3.3	4	2.3	13	3.2	110	2.6	
	Total	2870	100.0	728	100.0	177	100.0	402	100.0	4177	100.0	
2022	**Infants** (up to 1 y)	97	6.0	0	0.0	2	1.7	0	0.0	99	2.9	X^2 =1729.44 P<0.001*
	Child (>1-12 y)	1024	63.2	7	0.5	25	21.2	10	3.4	1066	31.4	
	Adolescents (>12<18Y)	62	3.8	110	8.0	13	11.0	23	7.9	208	6.1	
	Adults (18-<65 y)	423	26.1	1235	90.2	73	61.9	249	85.3	1980	58.3	
	Older adults (>65y)	14	0.9	17	1.2	5	4.2	10	3.4	46	1.4	
	Total	1620	100.0	1369	100.0	118	100.0	292	100.0	3399	100.0	

X^2 Chi Square test

* Significant (P < 0.05)

Table (7): Relation between the age and outcome of poisoning among the studied males (2020-2022)

		Improved		Complicated		DAMA		Death		Total		Test of significance
		No.	%	No.	%	No.	%	No.	%	No.	%	
2020	**Infants** (up to 1 y)	104	3.3	3	2.3	13	4.4	0	0.0	120	3.3	P^{MC}<0.001*
	Child (>1-12 y)	1152	37.0	21	16.2	101	34.7	0	0.0	1274	35.4	
	Adolescents (>12<18Y)	203	6.5	11	8.5	4	1.4	4	6.3	222	6.2	
	Adults (18-<65 y)	1617	51.9	93	71.5	167	57.4	58	92.1	1935	53.7	
	Older adults (>65y)	41	1.3	2	1.5	6	2.1	1	1.6	50	1.4	
	Total	3117	100.0	130	100.0	291	100.0	63	100	3601	100.0	
2021	**Infants** (up to 1 y)	115	3.1	1	1.0	9	2.6	0	0.0	125	3.0	P^{MC}<0.001*
	Child (>1-12 y)	1271	34.5	11	11.1	71	20.9	0	0.0	1353	32.4	
	Adolescents (>12<18Y)	276	7.5	5	5.1	14	4.1	12	20.3	307	7.3	
	Adults (18-<65 y)	1930	52.5	78	78.8	232	68.2	45	71.2	2282	54.6	
	Older adults (>65y)	87	2.4	4	4.0	14	4.1	5	8.5	110	2.6	
	Total	3679	100.0	99	100.0	340	100.0	59	100.0	4177	100.0	
2022	**Infants** (up to 1 y)	88	3.1	1	1.2	10	2.4	0	0.0	99	2.9	P^{MC}<0.001*
	Child (>1-12 y)	966	33.9	14	16.5	85	20.4	1	2.1	1066	31.4	
	Adolescents (>12<18Y)	174	6.1	6	7.1	22	5.3	6	12.8	208	6.1	
	Adults (18-<65 y)	1581	55.5	63	74.1	298	71.5	38	80.9	1980	58.3	
	Older adults (>65y)	41	1.4	1	1.2	2	0.5	2	4.3	46	1.4	
	Total	2850	100.0	85	100.0	417	100.0	47	100.0	3399	100.0	

P^{MC} value of Monte Carlo test

DISCUSSION

Poisoning is a worldwide medical and social problem. It is associated with variable rates of mortality and morbidity, and they are changeable with the type of poisoning. It is noticed that poisons have trends, so the emergency physicians and those in the primary care units should be aware of the prevailing trend in consumption of poisoning for better diagnosis and management. **(Aggarwal et al 2020)** To minimize the mortality and morbidity brought on by exposure to various chemicals and poisons, it is essential to interpret poisoning data to identify continuously changing threats and provide warning notifications. **(Saeed et al 2023)**

In the present study, a slight female predominance was observed, except for 2021 when male cases were slightly higher. The male-to-female ratio fluctuated between 0.93 and 1.01 over the three years. Suicidal poisoning was a significant concern, particularly among adults. This trend aligns with previous research suggesting a higher prevalence of suicidal poisoning among adults, potentially linked to factors like stress, financial strain, and unmet expectations. **(Aggarwal et al 2020, Abdelhamid W 2021, Beigh et al 2023 and Mesgarpour et al 2024)**

Previous research has yielded conflicting results regarding gender disparities in poisoning rates. **(Galahitiyawa et al 2008, Alnasser et al 2020 and Saeed et al 2023)** While studies from countries like Sri Lanka, Saudi Arabia, and Egypt have observed a higher incidence among females,

other studies have reported a male predominance. These variations may be influenced by cultural norms, societal expectations, and access to healthcare. **(Peshin et al 2018 and Aggarwal et al 2020)**

In this study, a statistically significant relationship was found between age group and the circumstances of poisoning. Accidental poisoning was the predominant mode of poisoning across all age groups followed by suicide in the adult age group. Notably, children aged 1-11 years and adults aged 18-59 years were most frequently involved in accidental poisoning incidents. Accidental poisoning in children occurs due to the nature of children, who are busy and always attempting to investigate their environment by tasting or drinking any medications or substances nearby, may help to explain the occurrence of poisoning at that young age. They may even mimic adults in some behaviors, such as taking medicine although they cannot comprehend the consequences of these behaviors. Another factor that mothers might claim that the drug is a candy to facilitate their consumption by the child. On the other hand, this may be due to neglect that affects young children who depend significantly on parental assistance. Medical negligence, delayed healthcare, unsuitable carers with substance abuse issues, emotional neglect, inadequate monitoring that exposes patients to risks, and carers who allow drug or alcohol use are all factors that may be involved in child poisoning. **(Kaka et al 2022 and Saeed et al 2024)** Furthermore, accidental poisoning is also expected among adults in developing and may be explained by workplaces conditions, their activity and interaction with environment. **(Al-Mahbashi et al 2024)**

The suicidal manner was prevalent in adult age group. These findings align with previous research, which suggests that attempted suicide by self-poisoning may be linked to recent interpersonal conflicts or underlying psychiatric disorders. In many cases, self-poisoning can be seen as a desperate attempt to cope with emotional distress. This association between mental health issues and suicide attempts is consistent with studies conducted in various settings. Moreover, societal factors, such as unemployment and economic hardship, can exacerbate depressive symptoms and increase the risk of suicidal behavior, particularly in developing countries. Additionally, interpersonal stressors, including relationship difficulties and academic failures, have been identified as significant risk factors for self-poisoning. **(Kasemy et al 2022)**

The oral route is the primary route for toxicity in the present study, and it is far from the other methods of exposure, such as bites, cutaneous exposure, and inhalation. Several studies reported comparable findings, with oral intake as the main route of exposure. This might be due to the presence of the oral form of the poison that can be swallowed either accidentally or suicidally. **(Asawari et al 2017)**

We found unknown, pesticides, alcohol, and household products to be the most common poisons used in male patients. Unknown materials contain toxic substances that the physician was unable to detect since the patient refused to disclose the individual's and usually it was in suicidal cases. Furthermore, it may be due to exposure to unlabeled substances outdoors.

A statistically significant association was found between the type of poison and age group. Corrosives and hydrocarbons were the most common substances ingested by children, while adults were more likely to be poisoned by alcohol, pesticides, carbon monoxide (CO), CNS medications, foodborne illnesses, and animal bites. For the pesticides, this might be because of the more prevalent farming profession and widespread use of pesticides in the agriculture sector in the nearby governorate. Poverty, failure of crops, family problems, and whenever there is a precipitating factor, one might try to end one's life. **(Aggarwal et al 2020 and Saeed et al 2023)** According to several research, individuals who are exposed to pesticides

may have psychological distress symptoms, depression diagnoses, and suicidal thoughts. They stated that workers poisoned by organophosphate displayed greater signs of despair compared to non-poisoned employees. **(Ghanem et al 2021)** The high suicide rates observed in our sample are supported by reports from the World Health Organization and Food and Agriculture Organization indicating that pesticides are commonly used for suicide in low- and middle-income countries. **(Suicide- WHO 2019)**

Alcohol ingestion is an accidental overdose and is usually seen in celebration of Christmas and New Year's. Cases presented with acute corrosive poisoning were mostly accidental due to the easy availability of the poison in their household which made people more prone to poisoning. To date, managing acute corrosive poisoning remains a challenging task due to potentially disastrous presentation and long-term sequelae. Some cases were severe enough to induce Esophagitis Dissecans Superficialis which was reported before. Several studies conform to the wide spread of corrosives and hydrocarbon poisoning especially among young children. **(Lu et al 2023, Saeed et al 2023, Elsobky et al 2024 and Ghanem et al 2024)**

In Egypt, CO is ranked as the sixth most frequent toxic exposure in 2004 and usually we see the cases in winter. Often referred to as the "silent killer," acute CO poisoning disrupts oxygen transport in the body by forming carboxyhemoglobin, leading to tissue hypoxia. **(Ghanem et al 2022)**

Foodborne illnesses remain a major global health concern, causing significant morbidity and mortality worldwide. In Egypt, food poisoning is a particular issue, with two primary main types: Botulism, this type of food poisoning occurs during specific cultural celebrations, particularly Easter, when the consumption of fermented fish (feseekh) is common. Bacterial, viral Foodborne Illnesses and parasites etc., these are caused by less severe pathogens such as Salmonella, Staphylococcus aureus, and various viruses. **(Ghitani et al 2021)**

The current work showed a rising trend of animal envenomation, CNS drug toxicities and hydrocarbon poisoning among the admitted cases. Urban development and building new cities bring citizen near the environment of toxic snakes and scorpion. This could explain the observed increase in animal envenomation. On the other hand, the rapid increase of CNS drug toxicity among males throughout the three years may be explained by the rising trend in mental disorders or the ease of obtaining these medications. **(Odehimi et al 2020)**

The current results showed a significant difference between the three years regarding the length of hospital stay where the highest percentage of males stayed between 1-3 days in 2022 compared to one day in 2020 and 2021. This indicates the severity of poisoning that necessitated longer bed days than before which necessitates further future planning for poison center resources. In addition, longer hospitalization period that reached more than 7 days was noticed in the current work. This period of hospital stay was greater than those seen in many hospitals in other regions. **(Galvao et al 2011)**

In addition, A statistically significant relationship was observed between age and length of hospitalization. Adults were discharged earlier compared to other age groups, likely due to their generally better overall health and a stronger desire to resume their daily activities. Kaka et al 2022 mentioned that the average hospital stay period for adolescents 1-3 days. **(Kaka et al 2022)**

Complete recovery occurred in more than 83.85% up to 88.08 % in the study period with a mortality rate of less than 2% with statistically significant relation between age and Outcome where improvement occurs in all age groups. This percentage could be due to the presence of specialized toxicologists who are oriented to poisons trends, manifestations and possibilities in case of unknown poisons. Furthermore, a significant relation was detected between the

outcome and circumstances in the three years, where death was reported mainly among suicidal cases. This may be explained by larger amounts of ingested poisons, delay in seeking medical help or unknown mixed substances ingestion which complicate the management plan.

In addition, the current work showed a significant relation between mortality and type of poison where pesticides caused 87.2% of deaths among admitted males in 2022. This attributed to the newly emerged pesticides especially aluminum phosphide which is available in the Egyptian market.

CONCLUSIONS

The findings of this study highlight the ongoing public health challenge posed by poisoning, particularly among specific demographic groups. Accidental poisoning represented the commonest circumstances among the admitted males. Unknown substances, pesticides and alcohol represented the commonest ingested agents throughout the three years. And pesticides caused 87.2% of deaths among admitted males in 2022. An observed rising trend of animal envenomation, hydrocarbon and CNS poisoning was noticed.

RECOMMENDATIONS

Further studies are needed to assess the trend of male poisoning in Egypt. Designing plans and preventing programs in the light of these trends will help resources allocation. Raising the awareness about pesticides poisoning and using protective personal equipment may decrease the incidence of accidental pesticide poisoning which has significant morbidity and mortality.

CONFLICT OF INTEREST

The authors declare no competing interests.

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تسمم الذكور في مركز السموم بالإسكندرية: الأنماط والنتائج السريرية

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لا يزال التسمم يشكل مصدر قلق كبير على الصحة العامة، وخاصة بين الذكور. **الهدف :** هدفت هذه الدراسة إلى دراسة نمط ونتائج التسمم لدى الذكور الذين تم ادخالهم إلى مركز السموم بالإسكندرية طوال ثلاث سنوات متتالية (من بداية عام ٢٠٢٠ إلى نهاية عام ٢٠٢٢). **الطريقة المستخدمة :** أجريت دراسة مراقبة بأثر رجعى قائمة على سجلات مركز السموم خلال الاعوام من ٢٠٢٠-٢٠٢٢. **النتائج:** تمت الدراسة على احدى عشر الفا و سبعمائة سبع و سبعين (١١٧٧٧) مريضا من الذكور. كان نمط التسمم الاغلب فى المرضى الذكور هو التسمم العرضي طوال السنوات، ويحدث بشكل رئيسى عند الأطفال. كان ابتلاع المادة السامة هو الطريق الأكثر شيوعًا للتعرض خلال السنوات الثلاث. وكان أكثر أنواع السموم استخداما هو المبيدات الحشرية (١٤,١٣%، ١٨,٣٦%، ١٧,٠٦%)، يليها الكحول (١٤,٠٥%، ١٦,٦٩%، ١٥,٩٨%) والمواد المسببة للتآكل (١١,٧٢%، ٩,٤٨%، ١٠,٢٧%) للأعوام ٢٠٢٠ و٢٠٢١ و٢٠٢٢ على التوالي. كان التسمم الرئيسي لدى الأطفال هو بسبب المواد المسببة للتآكل والهيدروكربونات. وتراوحت نسبة التسمم غير المحدد من ١٦,٨% إلى ٢٨,٦٣% في جميع السنوات. ولوحظ وجود اتجاه متزايد للتسمم بقرص او عض الافاعى و العقارب والتسمم بالمواد الهيدروكربونية وادوية الجهاز العصبي المركزي على مر السنين. وقد خرج أكثر من ٨٠% من الحالات المقبولة خلال الثلاث سنوات من المستشفى بعد تحسنها، وتراوحت فترات الاستشفاء من يوم واحد إلى ثلاثة أيام. تم الإبلاغ عن مضاعفات بين ٣,٦١% من المرضى في عام ٢٠٢٠ و٢,٥% في عام ٢٠٢٢. وكانت وفيات الذكور هي الأعلى في عام ٢٠٢٠ (١,٧٥%). تم اكتشاف علاقة ذات دلالة إحصائية ايجابية بين نوع السم والوفاة في السنوات الثلاث (PMC <0.001) وبين ظروف التسمم والنتيجة (P <0.001) وكانت العلاقة بين العمر والظروف ذات دلالة إحصائية ايجابية ايضا ، حيث ان اعداد الأطفال و البالغين هى الاعلى فى التسمم العرضي بينما كان اعداد البالغين فى الانتحار هى الاعلى خلال جميع السنوات .أظهرت العلاقة بين العمر ومدة الاستشفاء وجود فروق ذات دلالة إحصائية ايجابية حيث كانت مدة الإقامة لدى الشخص البالغ أقصر من جميع الفئات العمرية الأخرى.**الاستنتاج:** تسلط نتائج هذه الدراسة الضوء على التحدي المستمر الذي يشكله التسمم على الصحة العامة، وخاصة بين مجموعات ديموغرافية محددة. ولمعالجة هذه المشكلة بشكل فعال، من الضروري تنفيذ استراتيجيات الوقاية المستهدفة، وتحسين الوصول إلى الرعاية الصحية، وزيادة الوعي حول مخاطر التسمم. يجب أن تستكشف الأبحاث المستقبلية العوامل الأساسية التي تساهم في حوادث التسمم وتقييم فعالية التدخلات التي تهدف إلى الحد من حدوثها.

الكلمات المفتاحية: ذكر، المبيدات الحشرية، السموم، دراسة استرجاعية، النتيجة