Poisoning among Children in Qena University Hospital: Retrospective Study

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Abstract

Background: Unintentional poisoning is the leading cause of death in children, making it more critical to be aware of the warning signs and available treatments. Poison may come from common household products to very toxic chemicals.

Objectives: Evaluate pediatric poisoning incidence, management, and outcomes in Qena governorate

Patients and methods: A twelve-month retrospective study (January 2021 to December 2021) at Qena University Hospital. Data included demographics, poisoning details as, symptoms, history of exposure, clinical examination, and extensive lab investigations. Treatment spanned emergency, supportive care, decontamination, enhanced elimination, and antidotes. Outcomes, hospitalization duration, ICU reasons, and dispositions were documented.

Results: Patient Mean age 3.78 years, infants 39%, toddlers 32%, preschoolers 12%, school-age children 7%, adolescents 10%. Gender: 67% female, 33% male. Mean weight 15.78 kg, urban 59%, rural 41%. Median hospital delay 1 hour (0.5-3 hours). Common clinical presentations were Hypotension 25%, respiratory distress 49%, vomiting 38%. ICU admissions prevalence is 44%, average ICU stay of 2.14 days, pediatric department stay of 1.69 days, average time until discharge of 2.63 days. Age correlated positively with Medications/Drugs poisoning and negatively with Toxic/Poisonous Substances. Heart Rate, Respiratory Rate, and Systolic Blood Pressure correlated negatively with Medications/Drugs and positively with Toxic/Poisonous Substances. ICU correlated positively with Toxic/Poisonous Substances and Chemical Substances.

Conclusion: Infants and toddlers were most affected, females accounted for 67% of cases, chemical substances were the primary toxins (53%), varied clinical symptoms occurred, gastric wash was common, 44% needed ICU care, and timely intervention is vital to reduce poisoning impact.

Keywords: Children; Poisoning; Qena.

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Introduction

Early childhood carries a notable susceptibility to poisoning incidents, contributing to approximately 5% of unintentional childhood fatalities. It is imperative for healthcare professionals to possess an adept understanding of the manifestation of poisoning symptoms and an extensive comprehension of diverse treatments and antidotes. This necessity arises from the broad spectrum of toxic agents involved in poisoning incidents **(Al Rumhi et al., 2020).**

Childhood poisoning emerges as a significant focal point within the ambit of public health due to the inherent curiosity of children and their frequent exposure to perilous substances. The imperative of this issue rests on the trifecta of prevention, control, and a profound understanding of the consequences of poisoning. The effective amelioration of this challenge necessitates a collaborative approach involving healthcare practitioners, caregivers, educators, and legislators. This collaborative effort should encompass a comprehensive range of interventions, including poison removal, provision of supportive care, administration of antidotes, and specialized treatment for severe cases **(Schwebel et al., 2017).**

Predominantly, the most precarious exposures transpire through oral ingestion, accounting for an overwhelming 77% of cases. Poisons ingested by children under the age of 6 typically result from inadvertent contact with minuscule quantities of substances, often non-toxic or mildly dangerous. Swift assessment and evaluation are customary; however, it is pertinent to acknowledge that certain chemicals and pharmaceuticals can be lethally potent even when administered in minute doses **(Lee et al., 2019).**

The panorama of pediatric poisonings is frequently populated by innocuous-seeming items such as cosmetics, personal care products, cleaning agents, toys, and topical medications. Although these represent commonplace sources of exposure, it is paramount to discern that more potent substances, including hypoglycemic agents, opioids, alcoholic beverages, and antidepressant medications, can pose lethal threats even when consumed in trace amounts. The central tenet of this research endeavor is the meticulous examination of the incidence and management of pediatric poisonings **(Mintegi et al., 2017).**

The outcomes of pediatric poisoning incidents hinge upon multifarious determinants, including the nature and quantity of the toxic agent, the age of the affected child, the timeliness of medical intervention, and the presence of underlying health conditions. Mild cases are generally associated with complete recovery, whereas severe instances may culminate in organ impairment or fatality. The imperative for concerted global efforts toward prevention is underscored, necessitating modifications within the spheres of public health, education, medical practice, and legislative frameworks to engender safer environments for children and mitigate this preventable health scourge **(Dayasiri et al., 2018).**

The main aim of the study was to evaluate the epidemiology of poisoning incidents in 100 children, evaluate management, and ascertain the resulting outcomes.

Patients and methods

Study design and patient selection: This retrospective study was conducted at Qena University Hospital, specifically within its Pediatric department and Pediatric Intensive Care Unit, spanning 12 months from January 2021 to December 2021, with the aim of including up to 100 cases in the present research. All cases admitted to the pediatric department were screened for potential poisoning cases.

Inclusion Criteria: Inclusion criteria encompassed pediatric patients admitted to the hospital who exhibited compelling signs and symptoms suggestive of poisoning. This determination was made through an exhaustive assessment that included comprehensive history-taking, thorough physical examination, and pertinent laboratory investigations.

Exclusion Criteria: On the contrary, exclusion criteria were established to exclude patients presenting with pre-existing gastrointestinal disorders, neurological conditions, chronic kidney disorders, or cardiac ailments. This was done to mitigate the potential confounding effects of these comorbidities on the study's findings.

Data collection and assessment

1. Demographics: Demographic information, including variables such as age, gender, and place of residence, was systematically documented for each patient.

2. History of Present Illness: This comprehensive section encompassed vital information related to the poisoning cases. It included details about the specific toxic agent responsible for the poisoning, the time interval between the poisoning event and hospital admission, the route of exposure (which could encompass oral ingestion, inhalation, injection, dermal contact, or bites or stings), the nature of the poisoning incident (categorized as homicidal, suicidal, accidental, addiction-related, or due to therapeutic error), and whether any pre-hospital treatment had been administered.

3. Presenting Symptoms: Symptoms manifested by patients were systematically categorized based on the physiological systems affected. This classification included symptoms related to the gastrointestinal system (e.g., vomiting, diarrhea, abdominal pain), cardiovascular system (e.g., chest pain, dyspnea), respiratory system (e.g., cough, dyspnea), nervous system (e.g., headache, paresthesia), and genitourinary system (e.g., polyuria, hematuria).

4. Clinical Examinations: Patients underwent comprehensive clinical examinations upon admission, with subsequent assessments conducted as necessary, contingent on the type and severity of poisoning. These general examinations recorded vital signs, including pulse rate, blood pressure, temperature, and respiratory rate, with reference ranges stratified by age categories. Systemic examinations scrutinized the gastrointestinal, cardiovascular, respiratory, neurological, and genitourinary systems.

1. **Laboratory Investigations**: A battery of laboratory investigations was carried out, encompassing the following parameters:
   - **Random Blood Glucose Level**: Measured through colorimetric methods utilizing glucose oxidase to catalyze the oxidation of glucose to gluconic acid, assessed via spectrophotometry at a wavelength of 505 nm, with a reference range of 72-144 mg/dL **(Larijani et al., 2003).**
   - **Serum Electrolytes (Sodium and Potassium)**: Determined via ion-selective electrode techniques. Reference ranges were established at 135-150 mEq/L for serum sodium and 3.5-5.0 mEq/L for serum potassium **(Kumar et al., 2014).**
   - **Kidney Function Profile (Serum Urea and Creatinine)**: Assayed using the Beckman Coulter AU480 Clinical Chemistry System, with reference ranges of 10-50 mg/dL for serum urea and 0.2-1.2 mg/dL for serum creatinine **(Sayiner & Ozturk, 2014).**
   - **Liver Function Tests (Alanine Aminotransferase (ALT) and Aspartate Aminotransferase (AST))**: Conducted using the NADH

Kinetic UV method. Reference ranges were established at 0-45 IU/L for ALT and 0-40 IU/L for AST **(Gowda et al., 2009).**

- **Arterial Blood Gas Analysis (ABG)**: Analyzed for assessing key parameters, including pH, PaCO2, PaO2, SaO2, and HCO3. The principle employed was the ion-selective electrode technique, with reference ranges as follows: pH (7.35-7.45), PaO2 (80-100 mmHg), PaCO2 (35-45 mmHg), SaO2 (>95%), and HCO3 (22-28 mEq/L) **(Chandran, 2005).**

2. **Additional Diagnostic Measures**:
   - **Electrocardiography (ECG)**: ECG readings were recorded and analyzed based on clinical necessity.
   - **CT Brain Scans**: Conducted when patient admission indicated the need for such scans.

Treatment Measures

Patients received a comprehensive range of treatment interventions tailored to their specific clinical presentation. These interventions encompassed various aspects of care, beginning with emergency measures, which included addressing airway, breathing, and circulation (ABC) concerns. For patients in critical condition, this involved procedures such as endotracheal intubation, oxygen administration, and mechanical ventilation.

Additionally, supportive care measures were employed to address specific medical needs. Intravenous fluids were administered to maintain hydration and electrolyte balance. Histamine H2 receptor antagonists, known as H2 blockers, were prescribed to manage gastric acid secretion, while antibiotics were administered to treat or prevent infections that might have arisen as a result of the poisoning. Antiemetics were utilized to control nausea and vomiting, while corticosteroids were employed for their anti-inflammatory properties. In cases of hemodynamic instability, vasopressor agents were utilized to support blood pressure regulation.

Decontamination procedures

Decontamination procedures played a pivotal role in the management of poisoning cases. For patients requiring immediate intervention, dilution therapy was initiated to reduce the concentration of toxic substances in the body. Gastric wash, involving the careful removal of toxins from the stomach through lavage, was carried out when ingestion of toxins was suspected. Additionally, activated charcoal, known for its adsorptive properties, was administered to absorb toxins within the gastrointestinal tract, preventing their absorption into the bloodstream.

Enhanced elimination methods

To further address toxin elimination, several enhanced methods were employed. In cases where continued toxin absorption was a concern, multiple doses of activated charcoal were administered. Urine alkalinization was used to enhance the elimination of certain toxins through the urinary system. For patients with severe poisoning, dialysis, including hemodialysis or peritoneal dialysis, was considered when indicated, facilitating the removal of toxins from the bloodstream.

Antidotal Therapy

Specific antidotal therapies were applied to counteract the effects of particular toxins. Botulinum antitoxin was administered as an antidote for botulism poisoning. Atropine was utilized as an antidote for specific types of poisoning,

while deferoxamine was employed as an antidote for iron poisoning.

We re-evaluated the vitals and lab data of each patient after improvement by vanishing poisoning symptoms and just before hospital discharge.

Outcome Assessment

Patient outcomes were rigorously monitored throughout their hospital stay, with various aspects of their hospital experience carefully documented. This comprehensive assessment included evaluating the duration of hospitalization, which provided insights into the progression of treatment and recovery. The reasons for intensive care unit (ICU) admission were also documented, shedding light on the severity of poisoning cases and the need for specialized care. Finally, the ultimate disposition of patients upon discharge from the hospital was categorized into distinct outcomes, including complete recovery, partial recovery, transfer to another medical facility for specialized care, or death.

Ethical Considerations: Ethical approval was obtained from the institutional review board (IRB) committee. Stringent measures were employed to ensure the confidentiality of all collected data.Ethical Approval Code: SVU-MED-FMT010-1-22-9-437

Statistical analysis

Data entry and analysis were executed using SPSS software (Version 23.0). Quantitative data were summarized as means and standard deviations (SD), while qualitative data were represented as proportions and percentages. Statistical significance was determined by p-values, with values less than 0.05 considered significant. Pearson's correlation analysis was employed to assess associations between parameters.

Results

(Table.1): the mean age of the poisoned cases was 3.78 years. Infants accounted for 39% of the cases, followed by toddlers (32%), preschoolers (12%), school-age children (7%), and adolescents (10%). 67% of the patients were female **(Fig.1).** The mean weight was 15.78 kg. Most of the cases resided in urban areas (59%).

Table 1. Demographic data of the included subjects

Parameter		**Value (N = 100)**	
Age (Years)	Mean ± SD	3.78 ± 4.49	
Age category		Number	Percentage
• **Infant (<1yr)**		39	39
• **Toddler (1-3 years)**		32	32
• **Preschoolers (3-5 years)**		12	12
• **School-age children (6-12 years)**		7	7
• **Adolescents (> 12 years)**		10	10
Sex		Number	Percentage
• **Male**		33	33
• **Female**		67	67
Weight (Kg)	Mean ± SD	15.78 ± 7.24	
	Median	15.25	
	Range	6.9-33.3	
Residence		Number	Percentage

• **Urban**		59	59
• **Rural**		41	41

N: number of participants, Yr: year, Kg: kilogram, SD: standard deviation.

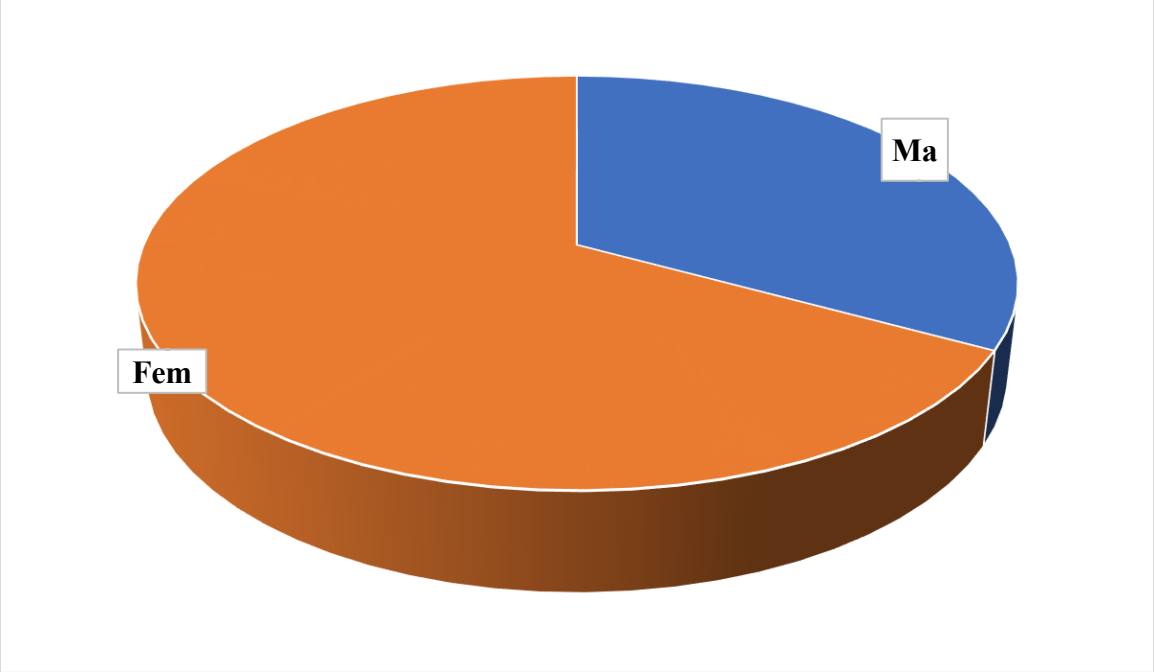

Fig.1.Sex distribution among the included subjects

(Table. 2) 56% of cases had a 1-hour delay. Chemical substances were the most common type of poison affecting 53%. 14% were poisoned by CNS drugs, 13% by CVS drugs, 26% by corrosives, 13% by pesticides and 20% by other cases including botulism, PPD, Addiction and iron supplements.

Table 2. Admission delay and poison characteristics among the included subjects

Parameter	**Value (N = 100)**	
Delay (hr) Median (Range)	1 (0.5-3)	
	Number of cases	Percentage (%)
• 0.5	6	6
• 1	56	56
• 2	22	22
• 3	16	16
❖ **Type of poison**		
Medications/drugs	33	33
Toxic/poisonous substances	14	14
Chemical substances	53	53
Poison		
❖ **CNS drugs**		
Clozapex	7	7
Depakine drug	7	7

❖ **CVS drugs**		
Indral	6	6
Atropine	7	7
❖ **Corrosive**		
Clorox	5	5
Phenol	7	7
Detergent	7	7
Caustic soda	7	7
❖ **Pesticides**		
Rodenticide	7	7
Insecticide	6	6
❖ **Miscellaneous**		
Botulism	3	3
PPD	3	3
Addiction (Hashish)	8	8
Iron supplements	6	6

N: number of cases, hr: hour, CNS: Central nervous system, CVS: cardiovascular system, PPD: Paraphenylenediamine.

(Table.3) showed that: there were improvements in respiratory rate (RR) ($p = 0.03337$*), systolic blood pressure (SBP) ($p < 0.0001$*), diastolic blood pressure (DBP) ($p < 0.0001$*), hemoglobin (Hb) levels ($p < 0.0001$*), white blood cell count (WBCs) ($p < 0.0001$*), red blood cell count (RBCs) ($p = 0.00003$*), mean corpuscular volume (MCV) ($p < 0.0001$*), mean corpuscular hemoglobin (MCH) ($p < 0.0001$*), pH ($p < 0.0001$*), partial pressure of carbon dioxide (PaCO2) ($p < 0.0001$*), bicarbonate (HCO3) ($p < 0.0001$*), alanine aminotransferase (ALT) levels ($p = 0.00002$*), aspartate aminotransferase (AST) levels ($p = 0.00008$*), and total bilirubin levels ($p < 0.0001$*).

Table 3.Comparison between pre- and post-management evaluations of the included cases

Parameters	**Initial evaluation (N = 100)**		**Post Management (N = 100)**		**P. Value**
	Mean ± SD	Median (Range)	Mean ± SD	Median (Range)	
Vitals					
HR (beat/min)	98.89 ± 23.69	93 (58-160)	95.71 ± 14.02	96.5 (70-118)	0.26612
RR (Breath/min)	27.36 ± 8.59	26 (14-46)	25.37 ± 3.38	26 (20-30)	0.03337*
Blood Pressure					
SBP (mmHg)	92.53 ± 11.45	93 (67-125)	104.91 ± 8.52	104 (90-119)	<0.0001*
DBP (mmHg)	53.4 ± 12.43	56 (26-76)	71.48 ± 5.97	72 (60-80)	<0.0001*
CBC					
Hb (g/dL)	11.62 ± 1.08	11.35 (9.7-15)	13.67 ± 1.56	13.75 (11-16)	<0.0001*
WBCs (*1000 cells/mm³)	11.99 ± 1.04	11.85 (9.6-16)	8.8± 2.2	8.6 (4.6-13.4)	<0.0001*
RBCs (*10^9cells/mm³)	4.48 ± 0.4	4.4 (3.8-5.5)	4.78 ± 0.5	4.8 (4-5.5)	0.00003*
MCV (femtoliters)	76.13 ± 6.62	75 (63.9-94.2)	90.5 ± 7.6	90 (78-102)	<0.0001*
MCH (picograms)	26.67 ± 2.28	27 (20.2-32)	30.11 ± 1.92	30 (27-33)	<0.0001*

ABG					
PH	7.36 ± 0.05	7.35 (7.25-7.45)	7.4 ± 0	7.4 (7.4-7.4)	<0.0001*
PaO2 (mmHg)	88.4 ± 6.86	88 (72-113)	89.93 ± 6.38	90 (80-100)	0.11561
PaCO2 (mmHg)	37.62 ± 2.44	37.9 (32.3-44.3)	39.6 ± 2.99	40 (35-45)	<0.0001*
HCO3 (mEq/L)	22.95 ± 2.24	22.9 (18.5-28.3)	24.75 ± 1.95	25 (22-28)	<0.0001*
Renal function					
Creatinine (mg/dL)	0.47 ± 0.08	0.47 (0.38-0.78)	0.45 ± 0.16	0.45 (0.2-0.7)	0.16771
Urea (mg/dL)	12.69 ± 3.11	11.8 (8-21)	12.15 ± 4.32	12 (5-20)	0.29705
Liver function					
ALT (U/L)	25.01 ± 5.24	24 (12-37)	31.56 ± 14.09	32 (7-56)	0.00002*
AST (U/L)	28.5 ± 6.39	29 (17-43)	23.05 ± 10.47	24.5 (5-40)	0.00008*
Total Bilirubin (mg/dL)	16.06 ± 2.74	16 (9-21)	0.67 ± 0.32	0.7 (0.2-1.2)	<0.0001*
Electrolyte measurements					
Na (mEq/L)	142.66 ± 11.91	143 (109-173)	140.1 ± 3.26	140 (135-145)	0.04509*
K (mEq/L)	4.21 ± 0.31	4.2 (3.5-4.9)	4.33 ± 0.48	4.4 (3.5-5.1)	0.02559*
Ca (mEq/L)	1.17 ± 0.08	1.17 (0.94-1.4)	9.32 ± 0.54	9.35 (8.4-10.2)	<0.0001*

Heart Rate (HR), Respiratory Rate (RR), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), WBCs: White Blood Cells, RBCs: Red Blood Cells, MCV: Mean Corpuscular Volume, MCH: Mean Corpuscular Hemoglobin, PaO2: Partial Pressure of Oxygen, PaCO2: Partial Pressure of Carbon Dioxide, HCO3: Bicarbonate

(Table.4) hypotension was the most common presentation in the cardiovascular system (25%). Respiratory distress affected 49%. Drooling of saliva was the most common presentation affecting 12%. Vomiting was the most common presentation in the gastrointestinal system affecting 38%. 23% suffered from drowsiness. All cases had ABC resuscitation. 77% had gastric wash for decontamination. Atropine was the most used antidote in 17%. Steroids were used in 22%. 60% of cases required antibiotics and 17% required H2 blocker.

Table 4. Presentation and management among included subjects

Presentation		**Number**	**Percentage**
System	Presentation		
Cardiovascular System	Bradycardia	5	5%
	Hypotension	25	25%
Respiratory System	Respiratory distress	49	49%
Oral	Drooling of saliva	12	12%
	Smell of phenol	5	5%
	Oral white patch	7	7%
Gastrointestinal System	Constipation	11	11%
	Difficult feeding	6	6%
	Gastroenteritis	6	6%
	Nausea	11	11%
	Severe abdominal pain	11	11%

	Vomiting	38	38%
Nervous System	Agitation	6	6%
	Confusion	6	6%
	Drowsiness	23	23%
	Lethargy	11	11%
	Unconsciousness	18	18%
	Weak cry	11	11%
	Weakness	6	6%
Management		Number	Percentage
Category	Treatment		
ABC	**ABC**	**100**	**100%**
Decontamination	Dilution therapy	22	22%
	Gastric wash	77	77%
Antidote	Activated charcoal	5	5%
	Botulium antitoxin	6	6%
	Atropine	17	17%
	Defroxamine	5	5%
Symptomatic Treatment	Steroids	22	22%
	Symptomatic treatment	6	6%
Antibiotics	Antibiotics	60	60%
	Vancomycin IV	8	8%
	Ultracillin	41	41%
	Clorofan	6	6%
	Claforan	35	35%
	Ceftriaxone	8	8%
	Ceftizidine	5	5%
Others	Adequate nutrition for 3 weeks	3	3%
	Ampoule of danset	5	5%
	Milk	5	5%
	Saline	5	5%
	H2 blockers	17	17%

ABC: Airway, breathing and circulation first aid, IV: intravenous.

(Table.5) There was a significant positive correlation between poisoning due to medication/drugs and age (P = 0.00002) especially with preschoolers and school-age children (P < 0.001) and with SPB (P= 0.0002), however there was significant negative correlation with infants age group (P < 0.001), HR (P = 0.04) and RR (P < 0.001). There was a significant positive correlation between poisoning due to toxic/poisonous substances and infant age group (P < 0.001), female sex (P = 0.045), HR (P <0.001) and RR (P < 0.001) however there was a negative correlation with other age groups, male sex (P = 0.045), SBP (P < 0.001) and DBP (P = 0.0096). There was a significant positive correlation between poisoning due to chemical substances and the toddler age group (P = 0.0005), and significant negative correlation with other age groups and HR (P = 0.004).

Table 5. Correlation between different poison types with patients' data and age

Variables	Medications/Drugs		Toxic/Poisonous Substances		Chemical Substances	
	r	P. value	r	P. value	r	P. value
Age (Years)	.410**	0.00002	-.401**	0.00004	-0.00804	0.93671
Age category						
• **Infant**	-.499**	<0.00001	.552**	<0.00001	-0.04791	0.63595
• **Toddler**	-0.18907	0.05957	-0.18907	0.05957	.342**	0.0005
• **Preschoolers**	.592**	<0.00001	-.230*	0.02117	-.327**	0.00089
• **School-age children**	.440**	<0.00001	-0.17109	0.08877	-.243*	0.01477
• **Adolescents**	0.089087	0.37809	-.208*	0.03796	0.107443	0.28733
Sex						
• **Male**	0.130728	0.19483	-.201*	0.04512	0.063408	0.53083
• **Female**	-0.13073	0.19483	.201*	0.04512	-0.06341	0.53083
Vitals						
• **HR**	-.203*	0.04273	.519**	<0.00001	-.286**	0.00397
• **RR**	-.472**	<0.00001	.573**	<0.00001	-0.09154	0.36507
• **SBP**	.364**	0.0002	-.563**	<0.00001	0.179761	0.07352
• **DBP**	0.095082	0.3467	-.258**	0.00959	0.147251	0.14375

R: Pearson correlation. HR: heart rate, RR: respiratory rate, SBP: systolic blood pressure, DBP: diastolic blood pressure.

(Table. 6): There was significant positive correlation between ICU admission and toxic/poisonous type (P = 0.02), chemical type (P = 0.003), MCV (0.001), PH (0.041), creatinine (P = 0.00007), and potassium levels (K) (P = 0.0002) and there was significant negative correlation with medication type of poison (P < 0.001), time of delay (P < 0.0001), SBP (P = 0.002), DBP (P = 0.0007), Hb (P = 0.0001), RBCs (P = 0.033). There was significant positive correlation between time till discharge and female sex (P = 0.008), rural residence (P < 0.0001), toxic/ poisonous type (P < 0.001), HR (P = 0.00003), RR (P = 0.00004), MCV (P = 0.005), creatinine (P = 0.005), potassium levels (P = 0.046) and significant negative correlation with age (P= 0.011), male sex (P = 0.0078), medications and chemical types (P = 0.0001), blood pressure ABG except PH, urea (P = 0.02), ALT (P = 0.002) and AST (P = 0.0001).

Table 6. Correlation between ICU admission and time till discharge with other parameters

Variables	ICU		Time till discharge	
	r	P. Value	r	P. Value
Age	-0.08936	0.3766	-.255*	0.01051
❖ **Sex**				
Male	0.020565	0.83907	-.265**	0.00779
Female	-0.02056	0.83907	.265**	0.00779
❖ **Weight**	-0.09889	0.32764	-.441**	<0.0001
❖ **Residence**				
Urban	0.001638	0.98709	-.479**	<0.0001

Rural	-0.00164	0.98709	.479**	<0.0001
❖ **Type of poison**				
Medications/drugs	-.553**	<0.0001	-.421**	0.00001
Toxic/poisonous substances	.232*	0.02002	.849**	<0.0001
Chemical substances	.292**	0.00325	-.377**	0.00011
❖ **Delay**	-.525**	<0.0001	0.124451	0.21733
❖ **Vitals**				
HR	0.126352	0.21033	.403**	0.00003
RR	-0.05383	0.5948	.399**	0.00004
❖ **Blood pressure**				
SBP	-.305**	0.00206	-.624**	<0.0001
DBP	-.387**	0.00007	-.204*	0.04213
❖ **CBC**				
Hb	-.378**	0.0001	-0.18819	0.06079
WBCs	0.146991	0.14446	-0.03419	0.73561
RBCs	-.213*	0.03327	-0.13343	0.18567
MCV	.316**	0.00138	.276**	0.00541
MCH	-0.05872	0.5617	-0.02521	0.80341
❖ **ABG**				
PH	.205*	0.04103	0.105693	0.29529
PaO2	-0.14339	0.15466	-.252*	0.0114
PaCo2	0.154145	0.12571	-.222*	0.02667
HCo3	0.128664	0.20204	-.300**	0.00242
❖ **Renal function**				
Creatinine	.387**	0.00007	.278**	0.00515
Urea	-0.07245	0.47378	-.231*	0.02052
❖ **Liver function**				
ALT	0.145218	0.14942	-.300**	0.00239
AST	0.037738	0.70932	-.378**	0.00011
Total Bilirubin	-0.00472	0.96281	0.032439	0.74867
❖ **Serum electrolytes**				
Na	0.147877	0.14203	0.041682	0.68052
K	.366**	0.00018	.200*	0.04565

R: Pearson correlation. HR: Heart rate, RR: Respiratory rate, SBP: Systolic blood pressure, DBP: Diastolic blood pressure, CBC: Complete blood count, Hb: hemoglobin, WBCs: White blood cells, RBCs: Red blood cells, MCV: Mean corpuscular volume, MCH: Mean corpuscular hemoglobin, ABG: Arterial blood gas, PaO2: Partial pressure of oxygen, PaCO2: Partial pressure of carbon dioxide, HCO3: Bicarbonate ion, ALT: Alanine aminotransferase, AST: Aspartate aminotransferase, Na: Sodium, K: Potassium

Discussion

Children's curiosity can lead to accidental poisoning, posing a significant health and safety concern (**Soave et al., 2022**). Protecting this vulnerable group necessitates a comprehensive response from medical professionals, caregivers, educators, and policymakers. Prompt actions, including poison removal, support, antidotes, and specialized therapies, are crucial (**Lee et al., 2022; Mubarak, 2021**). Outcomes of pediatric poisoning vary from mild to severe, influenced by factors such as toxin type, age, intervention timing, and

underlying health conditions (Salem et al., 2023). Addressing childhood poisoning requires a holistic approach involving public health measures, education, medical advancements, and legislative changes to reduce incidents and improve management and outcomes (**Azimi et al., 2023; Saikia, 2020**).

Regarding the present study, patients had a mean age of 3.78 years, including 39% infants, 32% toddlers, 12% preschoolers, 7% school-age children, and 10% adolescents. Gender distribution was 67% female and 33% male. Age-related factors make infants more susceptible due to exploratory behavior and oral fixation. Social and emotional stress can cause gender differences **(Saikia et al., 2020**).

Lin et al. (2011) studied 140 pediatric emergency cases, averaging 8.97 years. 35.7% were Toddlers, 15.0% were infants, and 7.9% were school-age children. This wider age range suggests variable toxic exposure patterns and effects. **Azab et al. (2016**) in Cairo found gender differences in poisoning frequency, with males more likely in preschool and school-age, notably among 2- and 3-year-olds.

In the present study, cardiovascular manifestation was present in 30%, respiratory system manifestation was present in 49%, oral manifestation was present in 24%, gastrointestinal manifestation was present in 83% and nervous system manifestation was present in 81%. Kohli et al. (2008) reported altered sensorium, respiratory distress, and convulsions in poisoning cases.

Pediatric poisoning cases received varied treatments, including 75% Resuscitation (ABC), dilution treatment (22%), gastric wash (79%), and individualized therapies such as activated charcoal (11%), and atropine (17%). Symptomatic treatments were emphasized in 9%. In agreement with the study done by **Woyessa et al. (2020**), who found that 68.72% received general resuscitation and 24.17% specific antidotes. Also, **Khan et al. (2016)** found differences in care, with 16.2% receiving antidotes, 52.8% activated charcoal, and 53.3% stomach lavage. **Dhanya et al. (2009)** also observed diverse treatments like stomach lavage (83%) and Ryles Tube Aspiration (80%). In agreement with the present study, Saudi Arabia, **Tobaiqy et al. (2010)** reported various treatments, including antidotes (44.9%), supportive care (21.7%), and no treatment (33.3%).

In the present study, vital signs, blood parameters, ABG, kidney and liver function, and serum electrolytes were normal. However, 44% required ICU admission (average stay: 2.14 days). The median time till discharge was 2 days. In agreement with the present study **Khan et al. (2016)** who reported a similar median hospitalization stay of 2 days.

Age and weight were significantly negatively correlated with duration of hospital stay ($r= -0.255$, $p= 0.01051$ and $r= -0.441$, $p= 0.0001$, respectively). Heart rate and respiratory rate showed significant positive correlations ($r= 0.403$, $p= 0.00003$ and $r= 0.399$, $p= 0.00004$, respectively) with hospital stay duration, while systolic blood pressure (SBP) and diastolic blood pressure exhibited significant negative correlations ($r= -0.624$, $p= 0.0001$ and $r= -0.204$, $p= 0.04213$, respectively). There were significant positive correlations between Hospital Admission Delay ($r=0.525$) and pH ($r=0.205$) with the need for ICU care, as well as significant negative correlations between SBP ($r=-0.305$) and DBP ($r=-0.387$) with the need for ICU care.

Dayasiri et al. (2018) found disparities in poisoning occurrences and medical issues, with most cases not causing problems but requiring transfers to higher care facilities. In agreement with the present study, **Sam et al. (2009)**, emphasized pre-

hospitalization's importance in poisoning severity, with timing being crucial. **Molla et al. (2022**) stressed the significance of the poisoning route and exposure duration of ICU stays and outcomes, with digestive tract poisoning having higher fatality risks and longer ICU stays. Poison kinds and duration may impact hospital stays and outcomes.

Conclusion

In conclusion, our retrospective study on pediatric poisoning in Qena governorate found that the mean age of patients was 3.78 years, with infants and toddlers accounting for the majority of cases. Females constituted 67% of the patients. Chemical substances were the most common poison category (53%), with significant variations in toxic agents. Vital signs showed a wide range, and various clinical manifestations were observed, with gastrointestinal and nervous system symptoms being prevalent. Gastric wash was the primary decontamination method. Approximately 44% of cases required ICU admission, with correlations between clinical parameters and hospital stay duration. Timely medical intervention and tailored treatments are crucial for mitigating the impact of pediatric poisoning in this region.

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