

**Retrospective Study of Acute Corrosive  
Intoxicated Preschool Children Presented to  
Poison Control Center Ain Shams University  
Hospital in 2009**

*Thesis*

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toxicology*

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**دراسة استرجاعية لحالات تسمم الاطفال  
بالمواد الكاوية فى سن ما قبل المدرسة والتي تم استقبالها  
بمركز السموم بجامعة عين شمس عام ٢٠٠٩**

رسالة علمية  
توطئة للحصول على درجة الماجستير فى السموم الإكلينيكية

مقدمة من الطيبة  
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٢٠١١

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**Salma Ibrahim**

## LIST OF ABBREVIATIONS

| Abbrev.                            | Meaning   |
|------------------------------------|---|
| <b>ABG</b>                         | Arterial blood gas                                  |
| <b>ALP</b>                         | Alkaline phosphatase                                |
| <b>ALT</b>                         | Alanine Aminotransferase (SGPT)                     |
| <b>ANOVA</b>                       | Analysis of variance                                |
| <b>AST</b>                         | Aspartate Aminotransferase (SGOT)                   |
| <b>ATLS</b>                        | Acute trauma life support                           |
| <b>ATSDR</b>                       | Agency for Toxic Substances and Disease<br>Registry |
| <b>° C</b>                         | Degree Celsius                                      |
| <b>CBC</b>                         | Complete Blood Count                                |
| <b>CNS</b>                         | Central Nervous System                              |
| <b>EGD</b>                         | Esophagogastroduodenoscopy                          |
| <b>EUS</b>                         | Endoscopic ultrasonography                          |
| <b>F</b>                           | Variance ratio                                      |
| <b>GIT</b>                         | Gastrointestinal tract                              |
| <b>H<sup>+</sup></b>               | Hydrogen ion  |
| <b>Hb</b>                          | Hemoglobin  |
| <b>HCT</b>                         | Hematocrit  |
| <b>HCO<sub>3</sub></b>             | Bicarbonate   |
| <b>H<sub>2</sub>SO<sub>4</sub></b> | Sulfuric acid                                       |
| <b>ICU</b>                         | Intensive care unit                                 |
| <b>IU/l</b>                        | International Unit/liter                            |
| <b>LDH</b>                         | Lactate dehydrogenase                               |
| <b>M</b>                           | Mean  |

## LIST OF ABBREVIATIONS (CONT...)

| <b>Abbrev.</b>                     | <b>Meaning</b>   |
|------------------------------------|--|
| <b>MCV</b>                         | Mean corpuscular volume                                    |
| <b>MCH</b>                         | Mean corpuscular hemoglobin                                |
| <b>MCHC</b>                        | Mean corpuscular hemoglobin concentration                  |
| <b>mEq/L</b>                       | Milliequivalent/liter                                      |
| <b>mg/dl</b>                       | Milligram/deciliter  |
| <b>mg/l</b>                        | Milligram/liter  |
| <b>mm</b>                          | Millimeter   |
| <b>mmHg</b>                        | Millimeter mercury   |
| <b>NGT</b>                         | Nasogastric tube   |
| <b>OH<sup>-</sup></b>              | Hydroxide ion  |
| <b>PaCO<sub>2</sub></b>            | Partial pressure of carbon dioxide                         |
| <b>PaO<sub>2</sub></b>             | Partial pressure of oxygen                                 |
| <b>PCCA</b>                        | Poison Control Center of Ain Shams<br>University Hospitals |
| <b>PPIs</b>                        | Proton pump inhibitors                                     |
| <b>PSS</b>                         | Poisoning severity score                                   |
| <b>PT</b>                          | Prothrombin time   |
| <b>SD</b>                          | Standard deviation   |
| <b>SO<sub>4</sub><sup>-2</sup></b> | Sulfates anion   |
| <b>SPSS</b>                        | Statistical Package for the Social Science                 |
| <b>TAR</b>                         | Titratable reserve   |
| <b>WBC</b>                         | White blood cell count                                     |
| <b>WHO</b>                         | World Health Organization                                  |

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

"قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا  
إِلَّا مَا عَلَّمْتَنَا  
إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ"

صدق الله العظيم  
سورة البقرة الآية (٣٢)

## **Introduction**

Acute poisoning is an important health issue in children which can result in severe evolution and even death. Many studies show that common household products, rather than pharmaceuticals, are now implicated in the majority of pediatric poisonings (*Verma, 2007; Kohli, et al., 2008*).

In developing countries, corrosive substances ingestion has been recognized as one of the major health problems in childhood. Acidic or alkaline cleaning materials are used mostly in kitchens in liquid or powder form, and these agents have been identified as common agents among corrosive substances ingested by children. The home is the most common place where such poisonings occur (*Cordero and savage, 2006; Melek et al., 2008*).

Ingestion of corrosives is a cause of concern because of the extreme morbidity associated with it. Caustic ingestions occur most commonly in children, especially those younger than 5 years old. In this age group ingestions are primarily accidental. This is in distinction to ingestions in adolescents and adults where the majority of which are intentional (*Lek, 2005; Dogen et al., 2006*).

Accidental ingestion of caustic agents is potentially capable of burning the upper part of the gastrointestinal tract. It is generally a problem of childhood, and young toddlers, where they are investigating their surroundings and are unaware of many dangers, so they are prone to this kind of accidents (*Dogan et al., 2006; Cibisev et al., 2007*).

## **Aim of the work**

The aim of this work is to study and evaluate the cases of corrosive intoxicated preschool children presented to the Poison Control Center of Ain Shams University Hospitals to determine the common agents, risk factors, and the outcome.

## **Historical Review**

At the end of the 19th century and beginning of the 20th century, lye products became commercially available for domestic use primarily as drain cleaners. Commonly available household products such as dishwashing liquids, window cleaning agents, and drain cleaners are highly corrosive agents if accidentally ingested. This increased availability is associated with an increasing number of accidental caustic ingestions in the pediatric population. Noting that no warning labels were being used on these products, Chevalier Jackson began a public campaign against some opposition to institute proper labeling on these containers and the Federal Caustic Act of 1927 was enacted (*Litovitz et al., 2002*).

In response to the recognition that caustic exposures were more frequent in children, in 1970 the Federal Hazardous Substances Act and Poison Prevention Packaging Act were passed stating that all caustic agents with a concentration more than 10% must be placed in child-resistant containers. By 1973, the household concentration for child-resistant packaging was lowered to 2%. In addition, the subsequent development of poison prevention education has led to dramatic decrease in the incidence of unintentional caustic injuries in children in the United States. The positive impact of both regulatory legislation and education is evident when observing the decrease of exposures in the United States compared to the number of exposures in developing countries that lack these policies (*Fulton and Rao, 2006*).

## Magnitude of the Problem

No available sufficient data about the whole corrosive exposures in Egypt, and more efforts are required to evaluate the problem. The following table represents numbers of corrosive intoxicated cases presented to Poison Control Center of Ain Shames University Hospitals (PCCA) during 2007 and 2008:

**Table (A): numbers of corrosive intoxicated cases presented to PCCA during 2007 and 2008.**

| Agent   | 2007 | 2008 |
|---|------|------|
| Bleach(Chlor)                                   | 795  | 703  |
| Sulfuric acid (H <sub>2</sub> SO <sub>4</sub> ) | 114  | 144  |
| Phenol  | 219  | 203  |
| Dishwashing soap                                | 134  | 111  |
| Total   | 1262 | 1161 |

Internationally corrosive ingestion is still a widespread problem in many areas of the world not only observed in developing countries but also in urban areas of developed countries as well. It is a serious problem that may carry great risk of morbidity and mortality (*Sarioglu-Buke et al., 2006*).

## Sources and uses of corrosive substances

Corrosives include concentrated acidic, alkaline, or oxidizing agents. A large number of industrial and commercial products contain potentially toxic concentrations of acids, bases, or other chemicals that can cause burns (*Cox, 2010*).