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Selected Topics: Toxicology

PEDIATRIC POISONINGS IN CHILDREN YOUNGER THAN FIVE YEARS RESPONDED TO BY PARAMEDICS

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□ **Abstract—Background: Treatment of poisonings in children has been well studied, but few data are available on the various causes of the poisoning episodes in the pediatric population. Objectives: To describe the incidence and demographics of accidental poisonings incurred by children < 5 years old in the County of San Diego, California who accessed paramedics through the 9-1-1 system. Methods: Eight years of prehospital records for children < 5 years of age were searched for poisoning cases. Detailed narrative information was abstracted to determine the circumstances surrounding the incident. Results: There were more than 40,000 paramedic transport calls for patients 5 years and younger over the study period; 996 (2.5%) of these calls had the chief complaint of poisoning. Of the calls classified as poisonings, 38% involved a 1-year-old and 35% involved a 2-year-old. Fifty-six percent of these poisonings involved either prescription or over-the-counter medications. An additional 16% were due to household cleaners. Eighty-eight percent of all calls were classified as mild in acuity, with 13% of poisoning calls for children under a year of age classified as moderate or acute; 50% of moderate or acute poisoning calls were to children 2 years of age. July and March were the months with the highest incidence of poisoning calls. The fewest calls were received on Saturdays and Sundays. Conclusions: Children 1 year of age had the highest incidence of unintentional poisonings. Among all age groups, medications were the number one cause of unintentional poisonings. Other unintentional poisonings could be prevented if hazardous materials were out of reach of children; many of the cases in this study happened in front of the parent with the parent watching.** © **2011 Elsevier Inc.**

□ **Keywords—prehospital; poisonings; pediatrics; paramedic; accidental poisoning**

INTRODUCTION

United States poison centers receive over 1.5 million calls annually for pediatric poisoning exposures, nearly half of which occur in children younger than 4 years of age. The top 10 causes of poisoning death in children younger than 6 years include hydrocarbon aspiration, prescription medication and iron ingestions, caustic ingestions, and toxic alcohol ingestion (1). The physical environment of the child plays a significant role in the epidemiology of accidental ingestions (2). One- to 3-year-old children are extremely inquisitive and often ingest toxic substances due to the appearance of the container the substance is stored in, thinking it is a candy or beverage. Also increasing risk is the "mimicking" of adult behavior of taking medications, and the increased access as guests, like grandparents, come into the home with medications in non-childproof containers kept in their purses or luggage. The high incidence of hospitalizations of children aged 1–3 years for toxic ingestions corresponds to their newfound ability to explore their

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environment. Caretakers also may underestimate their child's capabilities and leave dangerous toxins within reach. It has been reported that in approximately half of all accidental poisonings, the product was in use at the time of ingestion or had been moved from its usual storage site (2).

Poisonings are generally less severe for younger children than for older children or teenagers. Young children typically ingest smaller amounts of the toxic substance because they are being inquisitive and not trying to induce self-harm. For example, cosmetic and plant exposures are significantly higher in children < 5 years old when compared to adolescent exposures (3). These findings have supported parental education programs and legislative measures implementing childproof safety caps as a means for significantly declining the number of cases of annual pediatric poisonings.

Very little has been published on the impact or epidemiology of pediatric poisonings (4,5). The purpose of this study was to describe the demographics and type of poisoning occurring among children under the age of 5 years who were transported by ambulance for a poisoning event.

METHODS

Design

This was a retrospective, registry-based analysis of data collected over 8 years (calendar years 2000–2007). The data source was the Mobile Intensive Care Nurse (MICN) data from the prehospital patient record database maintained on the County of San Diego's Quality Assurance Network (QANet). The QANet is an online, real-time electronic communications network that connects all receiving hospitals, base hospitals, trauma centers, and many ambulance stations with the County of San Diego's Emergency Medical Services. The MICN enters patient data for every 9-1-1 call made within San Diego County. Aside from collecting prehospital patient data, the QANet provides real-time updates on the resource status of all receiving hospitals and trauma centers.

The study location is the County of San Diego, with a population of approximately 2.9 million people residing in urban, suburban, and rural and remote areas. Prehospital paramedics respond to approximately 220,000 calls annually, resulting in about 150,000 annual transports. Twenty-four advanced life support (ALS) ground transport agencies and a single aeromedical rotor-wing agency operate in the county, employing about 1000 paramedics to provide ALS-level emergency medical services. The study location has 20 Basic Emergency Departments (EDs), one dedicated to pediatric patients. Additionally, there is one Level I Trauma Center and five Level II Trauma Centers, including one dedicated to pediatrics. Medical direction is provided by written protocols, with available online medical direction via an MICN or base hospital physician when necessary.

Data Collection

Cases were identified by searching prehospital patient records for children < 5 years of age with a chief complaint of overdose (OD)/poisoning. Detailed narrative information was abstracted to determine the circumstances surrounding the incident. For the purposes of this study, poisoning may include ingestion, inhalation, or chemical spills on the body. The product of the poisoning was classified as a cleaning agent, cosmetic, medication, paint or solvent, pesticide, or plant. If the ingested or topical material was unidentified or did not fall into one of these categories (e.g., eating a cigarette), it was classified as other/unknown.

Acuity status is defined subjectively by paramedics as mild, moderate, or acute. A patient with "mild" acuity has stable vital signs and no apparent threat to life or limb. A patient with "moderate" acuity has a suspected threat to life or limb, and needs immediate evaluation by medical personnel. A patient with "acute" acuity status is one with an apparent need for immediate intervention to protect life or limb. Descriptive analyses for these patients were performed using SPSS version 11.0 (SPSS Inc., Chicago, IL). This study was approved by the University of California, San Diego Investigational Review Board.

RESULTS

There were more than 40,000 paramedic transport calls for patients under 5 years of age during the study period. Nine hundred ninety-six (2.5%) of these calls had a chief complaint of poisoning. The age distribution is shown in Figure 1. Out of all cases, 38% of patients were 1 year and 35% were 2 years of age. The type of poison identified from each record compared with age is displayed in Table 1. More than half of the poisonings were due to either prescription or over-the-counter medications, and 16% were due to household cleaners. Among

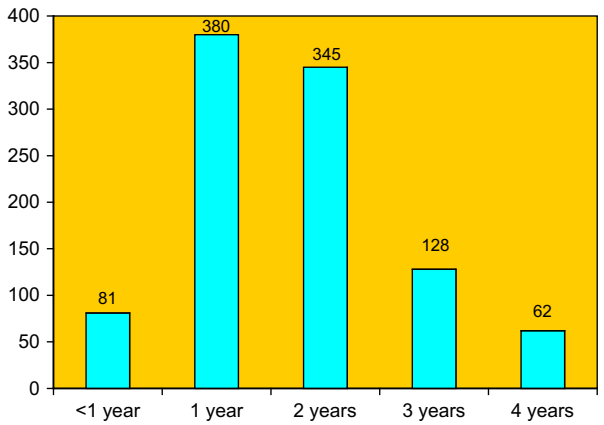

Figure 1. Poisoning victims by age.