Original article

Acute poisoning in children: Ten years' experience from a Northern Thai tertiary care center

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Objective Acute poisoning in children is a worldwide health problem. This study aimed to investigate patterns and features of acute poisoning in hospitalized children.

Methods This retrospective study was conducted using clinical data of 62 children diagnosed with poisoning who were treated and discharged from hospitalized at Chiang Mai University Hospital between January 2007 and December 2016.

Results The patients included 35 male and 27 female children age 6 months to 14 years 7 months, mean age 4.9±4.6 years. Among the 62 cases, 46 (74.2%) were less than 5 years old, and 49 (79.0%) were cases of unintentional poisoning. Among the poisoned children younger than 10 years most were males, whereas females predominated in those age 10 to 15 years. Medications were the most common poisoning agents, followed by household cleaning products, insecticides and pesticides, disc batteries, hydrocarbons, and others. The duration of hospitalization of the poisoned children ranged between 1 and 22 days; the mortality rate was 3.2% (2 children).

Conclusions Acute poisoning was most prevalent in children younger than five years old. Most cases were unintentional ingestion of medications or household products found in the house. Pediatricians and health care providers should take a key role in providing guidance to parents regarding methods to avoid incidents of acute poisoning in children. **Chiang Mai Medical Journal 2018;57(3):121-6.**

Keywords: poisoning, children, unintentional

Introduction

Acute poisoning in children is a worldwide health problem. According to the World Health Organization, in 2004 more than 45,000 children and youths under 20 years old died from unintended poisoning (1). Among children age 1 to 14, poisoning ranks as the fourth leading cause of unintentional injury death after traffic road injuries, fires, and drowning.

Child-resistant containers for medications have been recommended by public health policy in western countries (2), whereas in most developing countries, they are not strictly used. Even with child-resistant packaging, accidental poisoning by medications remains a significant problem in young children.

Many studies of unintended poisoning children from different parts of the world have been published. The results have shown different incidence patterns in different countries. In addition, patterns have changed over time

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(3-9). Only limited epidemiological information on acute poisoning in Thailand is available, especially in children (10). This study aimed to investigate patterns and features of acute poisoning in children admitted to Chiang Mai University Hospital, a tertiary center in Northern Thailand.

Methods

A retrospective study was performed using clinical data of 62 hospitalized children who were diagnosed with poisoning and who were treated and discharged from hospitalized at Chiang Mai University Hospital. Medical records of all pediatric patients with poison-related hospitalizations between January 2007 and December 2016 were reviewed. The only route of toxic exposure included in this study was oral ingestion. Poisonings from gases or venomous animals were excluded. Data recorded included age and sex of the patient, place of residence, month of exposure to the poisoning, poison agent(s), manner of poisoning, and duration of stay in the hospital.

Statistical analysis of the data was performed using the Statistical Package for the Social Sciences, version 22.0 (SPSS, Inc., Chicago, IL, USA). Quantitative variables are presented as the mean, range, and standard deviation; qualitative variables are expressed as frequencies and percentages.

Results

During the years 2007-2016, sixty-two children were admitted to the Pediatric Department due to acute oral poisoning.

Age and sex

The mean age of study participants was 4.9±4.6 years. Most cases were less than five years of age (46 cases, 74.2%). Fifty-six percent were males (n=35) and 43.5% were females (n=27) (male: female ratio=1.3:1). Figure 1 shows the gender and age distribution of cases. Regarding the manner of poisoning, the majority of cases were unintentional poisoning (49 cases, 79.0%), and most were under five years old (45 cases, 72.6%). Ten cases (16.1%) were found to be suicide attempts, all of which were over 10 years old. Three cases (4.8%) were intentional poisoning by the child's own parents.

Place of residence, time of day, and monthly distribution of poison exposure

Twenty cases (32.3%) were from urban areas, while 42 cases (67.7%) were from rural areas. Table 1 shows the distribution of poisoning by age and time of day. Most poisonings occurred between 8 pm. and midnight. The peak month of poisoning was March (11 cases, 17.7%); April was the month with the lowest rate of poisoning (1 case, 1.6%) (Figure 2).

Poisoning agents

Medications were the most common poisoning agents (22 cases, 35.5%) followed by household cleaning products (12 cases, 19.4%), insecticides and pesticides (10 cases, 16.1%), disc batteries (6 cases, 9.7%), hydro-

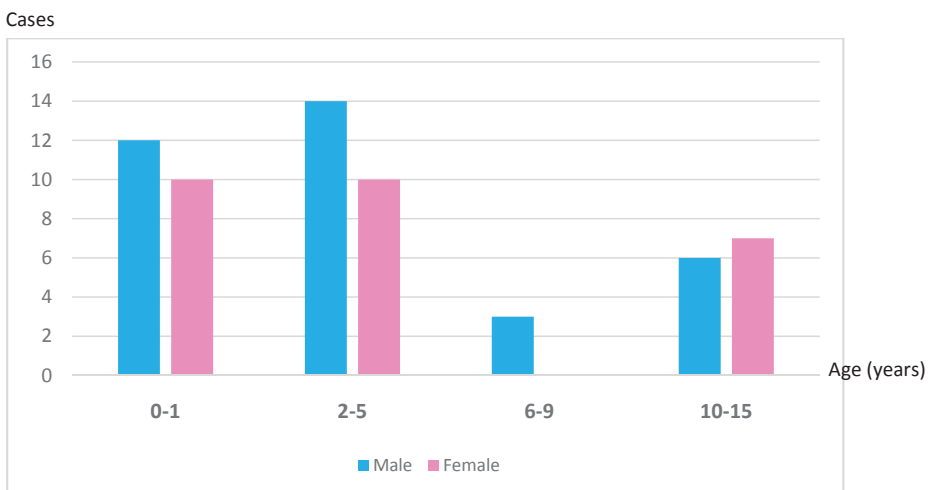

Figure 1. Characteristics of poison exposure categorized by gender and age group.

Table 1. Distribution of cases of poisoning by age and time of day (%)

Age (yr)	8 a.m.- noon	12 noon - 4 p.m.	4 p.m.-8 p.m.	8 p.m.- midnight	Midnight - 8 a.m.
0-1	38.1	14.3	9.5	38.1	-
2-5	17.4	30.4	17.4	34.8	-
6-9	-	33.3	-	33.3	33.3
≥ 10	23.0	7.7	7.7	30.8	30.8

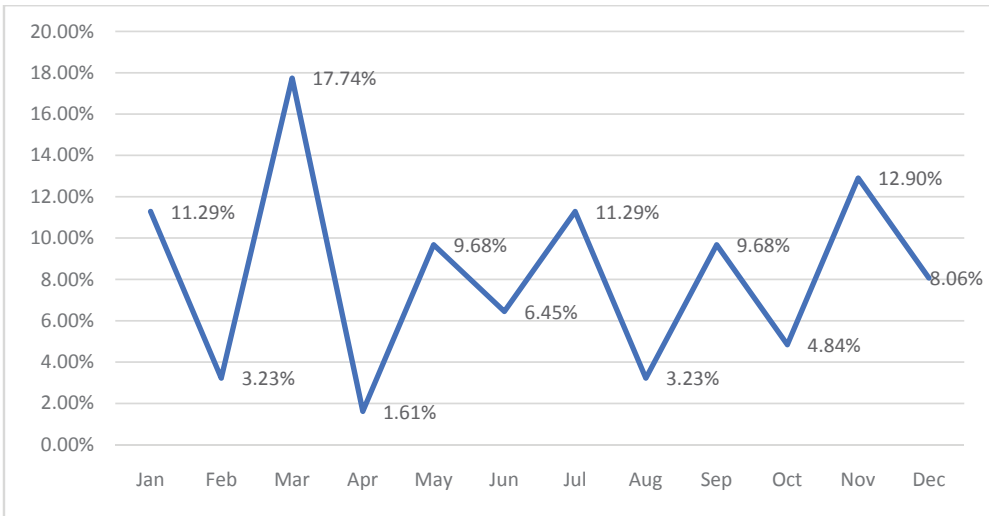

Figure 2. Distribution of cases of acute poisoning by month

carbons (2 cases, 3.2%), and other agents (10 cases, 16.1%). The other agents observed in this study were cigarettes, caffeine, plastic toys, nail varnish remover, and distilled water for car batteries. Poisoning agents characterized by age group are shown in Figure 3.

Treatment and outcome

The duration of hospitalization of poisoned children ranged between 1 and 22 days, with a mean of 3.42 (±3.90) days. The mortality rate was 3.2% (n=2), both cases resulting from suicide attempts by adolescents using paraquat.

Discussion

This study reviewed the records of sixty-two children and adolescents who were admitted to a tertiary care center in Northern Thailand with acute poisoning between 2007 and 2016. All patients were admitted to pediatric wards due to oral ingestion of poison substances. Most poisoning incidents occurred in infants and preschool children. This can be explained by their developmental stage which includes increasing mobility and development of a pincer grasp along with oral exploratory behavior. In addition, these young children can access agents stored at higher levels and in different rooms more easily than can very young children (12). For those reasons, the risk for acute poisoning exposure is greatest in that age group (11).

There were more males than females among children with poisoning younger than 10 years (male: female ratio=1.45:1), whereas females predominated for the age group 10-15-years. Gender distribution in this study was consistent with studies reported by Ram et al (13) and Saoraya et al (10). The results of this study suggest that most cases of acute poisoning in young children were unintentional, while the only intentional poisoning was found in adolescents. These findings are consistent with studies by Hassan et al (8) and Pac-Kozuchowska et al (14).

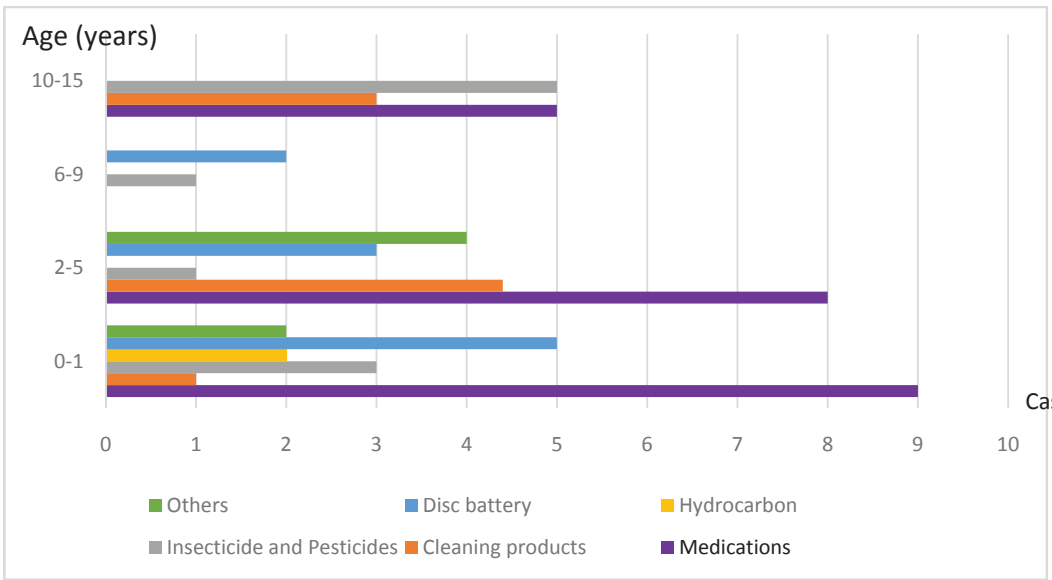

Figure 3. Poisoning agents by age group

Medications prescribed for the children and other family members were the most common poisoning agents in this study, similar to a previous study in Thailand (15) as well as studies in Europe (7,16), Africa (5,17), and Asia (3, 18-20). With the increasing urbanization of Chiang Mai, medications are becoming an increasingly important source of poisoning, while pesticide poisoning is more commonly found in rural agricultural areas. The most common identified medication in this study was neuroleptics (27.3%), followed by dextromethorphan (13.6%), analgesics (9.1%), and ferrous sulfate (9.1%). Just as in other developing countries in the region, lack of child-resistant caps and containers and unsafe storage practices, especially the use of secondary containers, may lead to increased incidences of poisoning. To reduce the rate of unintentional poisoning, physicians should be made more aware of the problem and safety containers should be used with specific drugs.

The data indicate that most cases of poisoning of children less than five years occurred between 8 am. and 8 pm. which is consistent with a study by Ram et al (13), while suicide attempts by adolescents occured mainly at night time. The information about the time of day when poisoning occurred may help physicians who take care of adolescents at risk to provide the anticipatory guidance. Because of the small sample size, statistically significant analysis of monthly distribution of specific poisoning agents was not possible. Most patients in this study exhibited good clinical signs and were discharged following a short period of observation. Specific antidotes were rarely needed, and complications from poisoning were rare. The mortality rate from acute poisoning reported from previous studies has ranged from 0 to 7.4% (3,4,7,13,18). The mortality rate in this study was 3.2%, both from suicide attempts by adolescents. Intentional poisonings for suicide is common in both adolescents and adults (21).

This study has some limitations. First, this study was retrospective so all the data depend on the quality of the medical records. Second, the population in this study consisted of hospitalized patients in a tertiary care center only and included only a small number of cases. Children with minor poisoning were treated at district hospitals or in the emergency department without hospitalization. Finally, patients with nonspecific symptoms whose parents did not report as poisoning or cases where the poison agent could not be identified were not included in this study. A larger sample and in-

clusion of potential risk factors, e.g., caregiver-child relationship and caregiver attributes (22), would provide additional information regarding possible means of poisoning prevention.

Conclusions

Acute poisoning is most prevalent in children younger than five years. Most cases are unintentional ingestion of medications or household products found in the house. Pediatricians and health care providers who work with families and children should take a key role in providing anticipatory guidance regarding injury prevention to reduce the incidence of acute poisoning in children.

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การได้รับสารพิษเฉียบพลันในเด็ก: ประสบการณ์การรักษาในโรงพยาบาลมหาราชนครเชียงใหม่ในช่วงระยะเวลา 10 ปี

นงลักษณ์ บุญชูดวง และ อรวรรณ เลาห์เรณู
ภาควิชากุมารเวชศาสตร์ คณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่

บทนำ การได้รับสารพิษเฉียบพลันในเด็กเป็นปัญหาสุขภาพที่พบทั่วโลก การศึกษานี้ต้องการศึกษารูปแบบและลักษณะของผู้ป่วยเด็กที่ได้รับสารพิษเฉียบพลันและเข้ารับการรักษาตัวในโรงพยาบาล

วิธีการศึกษา การศึกษาทบทวนย้อนหลังเวชระเบียนผู้ป่วยเด็กที่ได้รับการวินิจฉัยว่าได้รับสารพิษและเข้ารับการรักษาตัวในโรงพยาบาลมหาราชนครเชียงใหม่ระหว่างวันที่ 1 มกราคม พ.ศ. 2550 ถึงวันที่ 31 ธันวาคม พ.ศ.2559 รวม 62 ราย

ผลการศึกษา ผู้ป่วยเด็กชายจำนวน 35 ราย และเด็กหญิง 27 ราย (อายุระหว่าง 6 เดือน ถึง 14 ปี 7 เดือน) อายุเฉลี่ย 4.9±4.6 ปี พบว่าผู้ป่วย 46 ราย (ร้อยละ 74.2) อายุต่ำกว่า 5 ปี และ จำนวน 49 คน (ร้อยละ 79.0) ได้รับสารพิษโดยไม่เจตนา ในกลุ่มเด็กอายุต่ำกว่า 10 ปี พบว่ามีผู้ป่วยเด็กชายมากกว่าเด็กหญิง ในขณะที่กลุ่มอายุ 10-15 ปี พบมีเด็กหญิงมากกว่า สารพิษที่พบเป็นสาเหตุมากที่สุดคือยารักษาโรค รองลงมาเป็นสารเคมีที่ใช้ในครัวเรือน สารฆ่าแมลงและสารกำจัดศัตรูพืช ถ่านแบตเตอรี น้ำมัน และอื่น ๆ ระยะเวลารักษาตัวในโรงพยาบาลอยู่ระหว่าง 1 ถึง 22 วัน พบมีอัตราการเสียชีวิตร้อยละ 3.2

สรุปผลการศึกษา การได้รับสารพิษเฉียบพลันพบมากที่สุดในกลุ่มเด็กอายุต่ำกว่า 5 ปี ส่วนใหญ่เกิดจากการได้รับยา หรือสารเคมีที่ใช้ในครัวเรือนโดยไม่เจตนา กุมารแพทย์และบุคลากรทางสุขภาพมีบทบาทสำคัญในการให้คำแนะนำล่วงหน้าเกี่ยวกับการป้องกันสารพิษเพื่อลดอัตราการได้รับสารพิษเฉียบพลันในเด็ก **เชียงใหม่เวชสาร 2561;57(3):121-6.**

คำสำคัญ: สารพิษ เด็ก โดยไม่เจตนา