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Original communication

Fatal poisoning of chilhood in the Eastern Black Sea region of Turkey (2009–2013)

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ABSTRACT

Poisoning is a major problem worldwide among children. Nonetheless, the offending agent, the associated morbidity and mortality vary from place to place and show changes over a period of time. The aim of this study was to investigate the medico-legal paediatric autopsies of childhood poisonings in the Eastern Black Sea Region of Turkey. Reports of autopsies performed between 2009 and 2013 in the Morgue Department of the Council of Forensic Medicine. All medico-legal paediatric autopsies in Trabzon (n:1049) were retrospectively examined. The study comprised an investigation into 62 deaths from poisoning in children aged 0–18 years. The parameters of age, sex, toxic substance category and origin were evaluated. Poisoning accounted for 5.9% of the deaths of children aged 0–18 years. Of the 62 cases, 32 (51.6%) were male and 30 (48.4%) were female, giving a female to male ratio of 1/1.1. The primary causes of fatal poisoning in children were carbon monoxide (64.5%, n = 40), followed by drugs (16.1%, n = 10), insecticides (9.7%, n = 6), mushrooms (6.5%, n = 4), and snake venom (3.2%, n = 2). The results of this study implicated carbon monoxide poisoning as a serious risk factor for mortality in our region. Childhood poisoning may be prevented by public education and simple precautions in general.

1. Introduction

Poisoning is a major problem worldwide among children. Nonetheless, the offending agent, the associated morbidity and mortality vary from place to place and show changes over a period of time. With the control of infectious diseases, the rate of poisoning in childhood mortality and morbidity has been increasing in developed countries.[1–6]

National mortality data are an important source of monitoring the effect of some public health measures, although with poisoning care is needed if the available data are to be interpreted correctly.[7] Although much attention has been paid to the dangers of poisoning from household products, environmental contaminants, and drugs in children, deaths in fires attributed to the inhalation of the products of combustion (carbon monoxide and/or other fire gases) rather than burns may predominate in fatal poisoning statistics in this age group. However, carbon monoxide may also feature in accidental deaths in children, for example, improperly ventilated gas and other fires, and may also be used in homicides.[8]

The aim of this study was to investigate the medico-legal paediatric autopsies of poisonings in the Eastern Black Sea Region of Turkey. Reports of autopsies performed between 2009 and 2013 in the Morgue Department of the Council of Forensic Medicine. In conformity with the legislation in Turkey, the 0–18 years age group is accepted as the definition of children (Child Protection Law, Turkish Criminal Law, Turkish Civil Law).

The Black Sea Regional Center for Forensic Medicine assists in medico legal investigations in the region by offering expert opinions to facilitate legal authorization in understanding the medical implications of pathological examinations, including live medical examinations and postmortem examinations (autopsies), and pathological investigations and as one of the seven regional forensic centers in Turkey serving different geographical areas, is located in the city of Trabzon.

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2. Materials and methods

For this study, the autopsy records of the Morgue Department of the Trabzon Branch of the Council of Forensic Medicine were reviewed retrospectively for all paediatric poisonings recorded during the period 1 January 2009 to 31 December 2013. The cases were analyzed according to the following criteria: age group, gender, toxic substance category and origin. The children were divided into four age groups: 0–5 years, 6–9 years, 10–13 years, and 14–18 years. Major toxic substances were classified in five categories as CO, drugs, insecticides, mushrooms and snake venom. Toxicological analyses were routinely performed on blood, urine and organs (brain, lung, liver, heart, kidney, and stomach). Carboxyhemoglobin saturation was measured by CO-oximetry or UV/Vis spectrophotometry, screening for drugs was performed by liquid chromatography–tandem mass spectrometry (LC-MS-MS), and confirmatory analysis for drugs and pesticides was performed by gas chromatography-mass spectrometry (GC–MS), snake venom and mushroom poisoning was concluded from the autopsy findings and histological findings.

The Statistical Package for the Social Sciences (SPSS) version 13.0 was used for data analysis.

3. Results

Retrospective evaluation was made of the autopsy reports of the Morgue Department of Council of Forensic Medicine in Trabzon between the 1st of January 2009 to 31st of December 2013 (n: 5198). There were 1049 (20.18%) autopsy cases aged 0–18 years between 2009 and 2013. The manner of death categorized as accident, homicide, suicide, natural or unknown was evaluated based on legal investigations, autopsy reports and laboratory results. The evaluation of all paediatric deaths (n: 1049) revealed that 370 cases (35.3%) were caused by accidents, 261 cases (24.9%) were natural deaths, 202 cases (19.3%) were suicides, 132 cases (12.6%) were deaths from unidentified causes and 22 cases (2.1%) were homicides. Of the total paediatric deaths in the study period, in 62 cases (5.9%) the cause of death was poisoning (Fig. 1).

The various age groups involved ranged from less than 1 year to 18 years. Children were divided into four age groups: 0–5 years, 6–9 years, 10–13 years, and 14–18 years. Most poisoning incidents occurred in children aged 0–5 years (43.55%), followed by the 14–18 age group (30.65%). The age range was 0 to 18 years (9.10 ± 5.77). There were 32 males (51.61%) and 30 females (48.39%), and the male to female ratio was 1.1:1. The mean age of male cases was 8.22 ± 5.54 years, and of females was 10.03 ± 5.95 years.

The distribution of cases in term of age and gender is shown in Table 1. In the groups aged under 10 years there were more cases of poisoning in males than females (male: female ratio 1.6:1), whereas females predominated for ages 10–13 years and 14–18 years (female: male ratio 1.5:1).

The most common cause of children poisoning was carbon monoxide (64.51%, n = 40), followed by drugs (16.12%, n = 10), insecticides (9.68%, n = 6), mushrooms (6.45%, n = 4), and snake venom (3.22%, n = 2). The frequency of reported poisoning cases according to age group is shown in Table 2.

During the 5-year study period from 2009 to 2013, it was seen that carbon monoxide poisoning was the most significant agent of poisoning in children. In winter, carbon monoxide exposure was greater than exposure to other causes of poisoning. The greatest number of poisoning deaths was reported in January and the fewest in August. The deaths were associated with coal stoves, fires and water heaters in bathrooms. All of the carbon monoxide intoxications were accidental. According to the toxicology results, carboxyhemoglobin level ranged from 18.25 % to 82.58%.

Drugs were the second most frequent toxic agent category. The number of cases due to various drugs was 10 (16.12%). The most common drugs contributing to poisoning cases included antidepressants (amitriptyline 42%), benzodiazepines (midazolam 31%), anti-epileptic (phenytoin 12%), colchicine (10%) and anti-diabetics (metformin 5%). The drug intoxications were six accidental, and four by suicide. Multiple drug ingestion was the dominant agent of intentional poisoning in adolescents. There were six cases (9.68%) resulting from insecticides, 3 of which were suicide, and 3 were accidental. All of these were caused by carbamate insecticide. Mushroom poisoning was the reason in 4 cases (6.5%) and snake venom in 2 (3.23%).

4. Discussion

During the 5-year study period (2009–2013), deaths caused by poisoning accounted for 5.9% of all the paediatric autopsies performed in the Eastern Black Sea Region of Turkey. The following

Table 1
Distribution of poisoning in childhood by age groups and gender (n = 62).

Age groups	Male (%)	Female (%)	Total (%)
0–5	17 (27.42)	10 (16.13)	27 (43.55)
6–9	3 (4.83)	2 (3.23)	5 (8.06)
10–13	4 (6.45)	7 (11.29)	11 (17.74)
14–18	8 (12.91)	11 (17.74)	19 (30.65)
Total	32 (51.61)	30 (48.39)	62 (100)

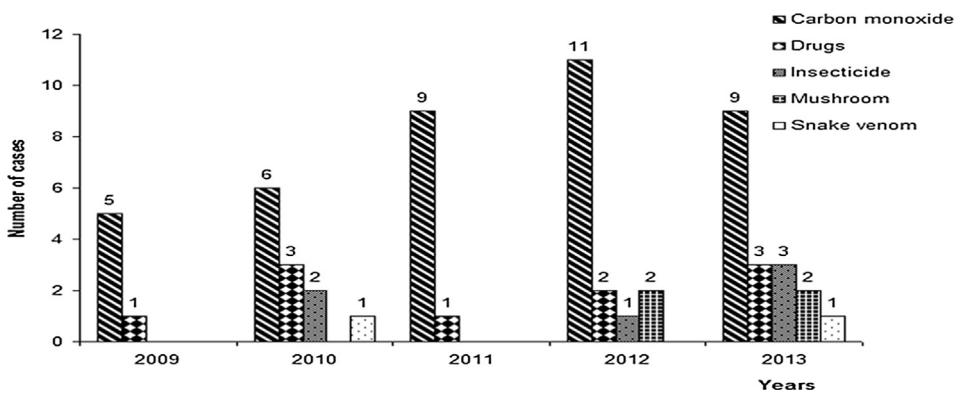

Fig. 1. Distribution of poisoning in childhood according to years and agents (n:62).