

OBSERVATION

HOUSEHOLD CHEMICALS – COMMON CAUSE OF UNINTENTIONAL POISONING

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Received November 2000

Of 4736 poisoning incidents registered in the Poison Control Centre in Zagreb from 1985 to 1999, household chemicals caused 23%. In the group of cleaning products, 11% of poisoning incidents were caused by corrosives, 9% by liquid detergents and 4% by hypochlorite. Ingested organic solvents caused 18% of household chemical poisonings; among them gasoline and thinners were the most frequent. Cosmetics were responsible for 7% of poisoning incidents; the most frequent were hair shampoo, hydrogen peroxide, and acetone. In the group of other chemicals, the most common were ingestion of thermometer mercury and of silica gel, while poisonings with highly toxic antifreeze, mothballs, or liquid fertilisers were rare. Ingestion or other exposure to household chemicals often caused excessive concern and therapeutic measures. It is therefore advisable to consult a Poison Control Centre in order to get proper information about the composition of a chemical and toxicity of a product.

Key words:
corrosives, household cleaning agents, organic solvents,
Poison Control Centre

Household chemicals make a heterogeneous group of products that significantly vary in use, chemical composition, and toxic potential. What is common for these products is that they are easily accessible to children and adults in their homes, gardens, or garages, and are often involved in suspected poisoning incidents reported to the Poison Control Centres (PCC) all over the world. Every year, these agents account for approximately 5–10% of reported toxic exposures in different countries (1)

and for 25–37% of accidental poisoning in children (2–4). An earlier report by the national PCC in Zagreb, Croatia revealed that household chemicals were implicated in 22.6% of all poisoning incidents reported to the Centre from 1984 to 1993 (5).

DATA COLLECTION

The aim of this study was to investigate the causes of suspected poisonings with household chemicals registered by the PCC in Zagreb between 1985 and 1999. The results are based on recorded phone inquiries about suspected poisonings received by the Centre over that period. The PCC in Zagreb – as one of many services provided by the Institute for Medical Research and Occupational Health – is the single national poison control centre covering about 4.5 million inhabitants. It is organised as a 24-hour telephone information service (emergency phone +385(1) 2348 342) for medical professionals and general public, but it has no hospital or laboratory facilities.

RESULTS AND DISCUSSION

Household chemicals accounted for 22.9% of 4736 poisoning incidents registered by the PCC in Zagreb from 1985 to 1999 (Table 1). Over 80% of those were accidental child poisonings. Among twenty major substances most commonly involved in the poisoning incidents, organic solvents, acids and alkali, and liquid detergents ranked 4th, 6th, and 8th, respectively (Table 2). For the purpose of this report we divided household chemicals in four categories according to use and/or chemical composi-

Table 1 *Causes of poisoning incidents reported to the Poison Control Centre in Zagreb between 1985 and 1999*

Causes of poisonings	N	%
Drugs	1703	35.9
Pesticides	1312	27.8
Household chemicals	1085	22.9
Industrial chemicals	243	5.1
Plants and animals	145	3.1
Miscellaneous	190	4.0
Unknown	58	1.2
Total	4736	100.0

N is the number of reported incidents.

Table 2 Twenty most frequent substances involved in poisoning incidents reported to the Poison Control Centre in Zagreb between 1985 and 1999

	Substances	N	%
1	Organophosphorous insecticides	289	6.1
2	Benzodiazepines	270	5.7
3	neuroleptic drugs	215	4.5
4	Organic solvents	199	4.2
5	Anticoagulant rodenticides	142	2.9
6	Acids and alkali	127	2.6
7	Pyrethroid insecticides	111	2.3
8	Liquid detergents	98	2.0
9	2,4-D herbicides	85	1.8
10	Antidepressants	84	1.7
11	Triazine herbicides	79	1.6
12	Anticonvulsants	73	1.5
13	Fluorides	71	1.5
14	Copper fungicides	67	1.4
15	Antibiotics	55	1.1
16	Paracetamol	50	1.0
17	Hypochlorite	48	1.0
18	Thermometer mercury	40	0.8
19	Organochlorine insecticides	38	0.8
20	Silica gel	38	0.8

N is the number of reported incidents. Percents (%) refer to the total of 4736 incidents

tion and presented them as a percentage of all poisoning incidents with household chemicals (Table 3).

We are aware that the number of poisoning incidents reported to the PCC is significantly lower than the actual number of poisonings in Croatia. It was estimated that only one in every 50 ingestions is reported to a PCC, which suggests that most of them are innocuous (6). Physicians who have experience with certain cases of poisoning will not require information from the PCC. By contrast, poisonings that are serious, rare, or clinically interesting may be reported more often than mild and frequent cases, which explains the selective reporting (7). Household chemicals are a relatively unknown area to many physicians. These agents are often thought to contain highly toxic ingredients, which in turn results with overstress and overtreatment, especially when it comes to children. A comparison with our earlier results showed that no major change occurred in the incidence of poisonings with household products, that is, it remained at about 22% of all poisoning incidents reported to the PCC (5). This is in accordance with the results of a 11-year survey of child poisoning in Zagreb by *Ficnar and co-workers* (8). The authors found that »commercial products« were responsible for 18% of hospital admissions of which the majority concerned children under the age of four. Although 47% of exposures to household chemicals were symptomatic, the symptoms were usually mild and treatable with simple measures such as cessation of exposure and dilution with water or demulcents. In cases where potentially toxic outcome cannot be positively excluded, a short-time clinical

Table 3 Poisoning incidents with household chemicals reported to the Poison Control Centre in Zagreb between 1985 and 1999

Household chemicals	N	%
Cleaning products	275	25.3
Acids and alkali	119	11.0
Liquid detergents	98	9.0
Hypochlorite	43	3.9
Organic solvents	194	17.9
Thinners	98	9.0
Gasoline, gas oil	72	6.6
Paints, varnishes	18	1.6
Cosmetics	76	7.0
Acetone	23	2.1
Shampoo	13	1.2
Hydrogen peroxide	12	1.1
Perfumes	8	0.7
Other		
Thermometer mercury	40	3.7
Silica gel	38	3.5
Antifreeze	22	2.0
Mothballs	15	1.4
Batteries	13	1.2
Fertilisers	12	1.1
Cigarettes	6	0.5

N is the number of reported incidents. Percents (%) refer to the total of 1085 incidents with household chemicals

observation is recommended in order to ensure that no aggravation of symptoms will occur (9). Similar to the experience of other PCCs, we encountered serious poisoning due to corrosive ingestion, and the severity of symptoms depended on the concentration of acid or alkali in the product and of the ingested amount (10). All-purpose cleaners containing less than 10% of acids, alkali, or hypochlorite and ingested in small quantities (one or two mouthfuls) usually produce only slight irritation of the gastrointestinal tract with no corrosive damage (11). By contrast, poisonings with drain cleaners based on highly concentrated sulphuric acid or sodium hydroxide are potentially fatal even in small doses which are common in accidental ingestion. Exposure to vapours of household cleaning products, mostly those containing sodium hypochlorite or hydrochloric acid often results in irritation of mucous membranes and/or the respiratory tract. The most common effects are cough, dyspnoea, and throat irritation (in all 21 cases reported to our PCC) with complete resolution within 24 hours and normal chest radiographs and arterial blood gases. When combined with acids, hypochlorite solutions may produce chlorine gas, but usually in concentrations too small to cause any significant damage.

Hydrocarbon ingestions are the likely cause of aspiration pneumonitis, even if small amounts are ingested: The risk grows with the viscosity of the product. It also depends on the mode of ingestion (such as aspiration through a tube from a gas

tank) and whether vomiting followed (12). The risk associated with systemic poisons such as ethylene glycol (antifreeze) is always high and such poisoning requires timely and specific treatment, preferably in hospital environment to avoid fatal complications (13). Some frequently ingested household products including button-shaped power cells, mothballs (camphor, naphthalene, or *p*-dichlorobenzene), or liquid plant fertilisers may cause serious problems under adverse circumstances (for example if the power cell is stuck in the oesophagus) and in certain susceptible individuals. Such incidents require close medical observation, but are usually benign (3, 14).

Crucial information for an adequate assessment of risk of exposure to household chemicals are the chemical composition and toxicity of each ingredient and detailed knowledge of the circumstances of exposure (intentional or accidental, route of exposure, doses involved, time and exact description of an incident). The physician will then be able to provide optimal treatment and prevent unnecessary anxiety, emergency room treatment, or hospital admission.

It is important to emphasize that poisoning with household chemicals, especially child poisoning, can easily be prevented. Child-resistant packaging, visible labels, and secure storage are the key measures preventing unintentional exposure (15, 16).

CONCLUSION

Despite the possibility of underestimation of common poisonings, PCC data seem to be a reasonable approximation of the true poisoning incidence. PCC is able to provide information about specific ingredients and potential toxicity of household products, as well as treatment guidelines. Good preventive strategies, such as purchase of safely packed and visibly labelled potentially toxic products, and public education programmes can reduce the incidence of unintentional poisoning with household chemicals.

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Sažetak

KUĆNE KEMIKALIJE – ČESTI UZROK NENAMJERNIH OTROVANJA

Od 4736 zabilježenih otrovanja u Centru za kontrolu otrovanja u Zagrebu od 1985. do 1999. godine, u 23% uzrok su bile tzv. kućne kemikalije. U skupini sredstava za pranje i čišćenje, 11% slučajeva uzrokovano je korozivima, 9% tekućim detergensima i 4% hipokloritima. Organska otapala uzrokovala su 18% otrovanja kućnim kemikalijama, najčešće zbog ingestije benzina i razrijeđivača. Na kozmetička sredstva otpada 7% otrovanja kućnim kemikalijama, a najčešće su bile ingestije šampona za kosu, vodikova peroksida i acetona. Od ostalih kućnih kemikalija najčešća je bila ingestija žive iz toplomjera i silikagela, dok su otrovanja antifrizom, naftalinom ili tekućim gnojivima relativno rijetka.

Slučajevi ingestije ili druge izloženosti kućnim kemikalijama izazivaju veću zabrinutost i primjenu energičnijih terapijskih zahvata nego što to zaista zaslužuju po svojim toksičnim svojstvima. Moguće je također podcijeniti opasnost od otrovanja ovim proizvodima jer se smatraju *a priori* malo toksičnim. U nekim slučajevima, posebno ako u inicijalnoj fazi otrovanja nema izraženih simptoma, to može biti uzrok nepravodobnog ili neprikladnog liječenja i posljedičnog lošeg ishoda. Zbog toga preporučamo da se kod sumnje na otrovanje kućnim kemikalijama, liječnik konzultira s Centrom za kontrolu otrovanja, od kojeg može dobiti informacije o sastavu i toksičnosti pojedinog proizvoda.

Mogućnosti prevencije otrovanja kućnim kemikalijama su velike, i to ponajprije edukacijom u obitelji, jer se najčešće radi o nenamjernim otrovanjima kod djece. Proizvođačima sredstava namijenjenih za domaćinstvo treba preporučiti odnosno zakonski odrediti uporabu pakovanja sa zaštitnim zatvaračima. Djelotvornost ovih mjera potvrđena je iskustvima drugih zemalja.

Ključne riječi:

Centar za kontrolu otrovanja, korozivi, organska otapala, sredstva za čišćenje u domaćinstvu

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