

# POISONING DUE TO COMMON HOUSEHOLD PRODUCTS

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## ABSTRACT

*From 1988 to 1992, 187 patients were admitted to four general medical wards at the Prince of Wales Hospital, Hong Kong with poisoning due to common household products. The main agents involved included "Dettol" liquid (46%), cleaning products (19%), pesticides (14%), and shampoos (10%). The majority of patients had only relatively mild symptoms. Ingestion of Dettol liquid and strong corrosives tended to be associated with serious complications and deaths. Two patients died after aspiration of Dettol liquid and detergent before and/or during gastric lavage. One other patient died after swallowing sulphuric acid. As with all poisoning, it is very important that the airway is adequately protected before gastric lavage is performed.*

*Keywords : poisoning, household products, Dettol, aspiration.*

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## INTRODUCTION

Household products pose a difficult problem in poisoning because of the lack of toxicity data in humans. Frequently, the only information available is the trade name of the product and the purposes for which it is intended. In most instances, however, it is possible to make an educated guess of expected toxicity on the basis of the nature of the product.

The purpose of this report is to consider the toxic potential of those household products which are commonly used for self-poisoning by adults in Hong Kong.

## SUBJECTS AND METHODS

The Prince of Wales Hospital (PWH) is the sole general teaching hospital in the New Territories East of Hong Kong serving a population of 1.1 million. There are three accident and emergency departments in this region including the one at the PWH.

From January 1988 to December 1992, all patients admitted to four of the eight general medical wards at the PWH with acute poisoning due to household products were included in the study. Household products were defined as those products found in the home environment, not of a medicinal nature<sup>(1)</sup>.

The hospital records of these patients were then reviewed. Demographic data and information regarding agents used, clinical features, treatment, and the outcome were entered into a database. For patients who had concomitantly taken drugs or chemicals, only signs and symptoms which could be

attributed to the household products were considered. If a patient had been exposed to more than one household product, the main agent involved was used for analysis.

## RESULTS

During the study period, 187 subjects (93% Chinese) were admitted because of poisoning from household products, accounting for approximately 1% of all acute medical admissions. There were 49 men and 138 women. The subjects were relatively young with a mean  $\pm$  SD age of  $31.3 \pm 16.9$  years (83% below the age of 40). Amongst the medical in-patients, the male to female ratio was 1.1 to 1 and the mean  $\pm$  SD age of the men and women were  $59.0 \pm 19.7$  (40% below the age of 60) and  $64.1 \pm 22.0$  years (33% below the age of 60), respectively<sup>(2)</sup>.

Exposures to household products were considered to be accidental in 10 (5%) subjects. The vast majority of patients (95%) deliberately poisoned themselves with these compounds either alone (75%) or in combination with drugs, alcohol or chemicals (25%). The reasons for self-poisoning included emotional upset, social crisis and physical illness. Ten patients (5%) had schizophrenia or anxiety/depression.

Most subjects (92%) presented to an accident and emergency department within four hours of exposure to a poison (mean 1.6 hours). Gastric emptying and lavage using a nasogastric tube was performed in 75% of subjects, and a further six patients received ipecacuanha.

The types of household products involved and the morbidity and mortality in the 187 patients are summarised in Tables I and II. Disinfectants particularly "Dettol" liquid (48%) (chloroxylenol 4.8%, isopropyl alcohol and pine oil), cleaning products (19%), pesticides (14%) and shampoo (10%) together accounted for more than 90% of cases. Three patients died, giving an overall mortality of 1.6% (Table II). The mean  $\pm$  SD length of stay amongst the 184 survivors was  $2.5 \pm 3.9$  days (75% for one to two days).

## "Dettol" liquid

The majority of subjects (86%) with "Dettol" poisoning experienced nausea and/or vomiting, sore mouth and throat, hoarse voice and epigastric/abdominal pain. Four patients were comatose with hypotension on admission. In seven patients, aspiration of Dettol and the gastric contents before and/or during the gastric lavage had resulted in pneumonia, adult respiratory distress syndrome (ARDS) and/or exacerbation of chronic obstructive airways disease (see Table II). One patient who had also taken paracetamol was given a full course of intravenous N-acetylcysteine.

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**Table I - The types of household products involved and the morbidity and mortality in 187 patients with self-poisoning.**

	No symptoms	Minor Features*	Non-fatal, serious complications**	Deaths**	Total
<b>Disinfectants</b>					
Dettol	12	67	6	1	86
Others	0	4	0	0	4
<b>Cleaning products</b>					
Detergent	7	9	0	1	17
Bleach	2	5	1	0	8
Others	4	6	0	1	11
<b>Pesticides</b>					
Insecticides	7	11	1	0	19
Rodenticides	3	4	0	0	7
Shampoo	5	13	0	0	18
Cosmetics	2	3	0	0	5
Others***	3	7	2	0	12
<b>Total</b>	<b>45</b>	<b>129</b>	<b>10</b>	<b>3</b>	<b>187</b>

\*eg minor symptoms such as nausea, vomiting, abdominal pain and sore throat.

\*\*Refer Table II.

\*\*\*including caustic soda, potassium permanganate, mothball, tobacco, floor polishes, turpentine, organic solvent.

**Table II - Serious complications and outcome in 13 patients with poisoning due to household products.**

Household products	Main features	No. of patients	Outcome
"Dettol"	Aspiration pneumonia, ARDS	1*	Died
	Aspiration pneumonia, ARDS	1*	Survived
	Aspiration pneumonia	4	Survived
	Exacerbation of COAD	1	Survived
Detergent	Aspiration pneumonia, ARDS	1*	Died
Drain cleaner (sulphuric acid)	Perforated gastrointestinal tract, ARDS	1*	Died
Caustic soda	Stridor, tracheo-oesophageal	1*	Survived
Insecticides	Aspiration pneumonia	1	Survived
Bleach	Severe corrosive effects on upper gastrointestinal tract	1	Survived
Potassium Permanganate	Severe corrosive effects on upper gastrointestinal tract	1	Survived

\*required ICU care.

ARDS = adult respiratory distress syndrome

COAD = chronic obstructive airways disease

### Cleansing products

When swallowed, household cleaning products generally gave rise to mild symptoms. These subjects might develop nausea, vomiting, epigastric/abdominal pain and sore throat. One patient who had ingested an unknown amount of detergent died from aspiration and ARDS shortly after gastric lavage was performed (Table II). The only patient who had swallowed a drain cleaner (sulphuric acid) died from perforation of the gastrointestinal tract and ARDS (Table II).

### Insecticides

Patients who had ingested household insecticides might have nausea, vomiting and features of cholinesterase inhibition; three patients received intravenous atropine (n=2) or atropine plus pralidoxime (n=1). Although none of the subjects with

rodenticide poisoning had prolonged prothrombin time on admission, four were given intravenous vitamin K<sub>1</sub>.

### DISCUSSION

Poisoning due to household products is particularly common in Hong Kong. They accounted for approximately 19% of the main agents used by adult patients in self-poisoning, and each year there were approximately 60 to 80 admissions to our medical wards from 1988 to 1991<sup>(3)</sup>. This figure is considerably higher than those (3 to 5%) reported from other developed countries<sup>(4,5)</sup>.

Dettol liquid, which is widely available as a household disinfectant, was commonly used for self-poisoning in Hong Kong. It accounted for 46% of the household products used in this study and 10% of the main agents involved in our

previous study of self-poisoning<sup>(3)</sup>. Although it is described as non-poisonous, there have been several reports of serious poisonings and even deaths<sup>(6-9)</sup>. The majority (86%) of our patients had relatively mild symptoms related to its corrosive action on the oral mucosa, throat and gastrointestinal tract. Serious complications including aspiration pneumonia, ARDS, upper airways obstruction may occur in up to 8% of patients<sup>(10)</sup>. The increased risk of aspiration in Dettol poisoning may be related to the central nervous system depressant effect of its three constituents, its local effect on the throat impairing the gag reflex and/or the inadvertent use of gastric lavage<sup>(10)</sup>. It is therefore very important that the airway is adequately protected before the gastric lavage is performed.

Ingestion of household cleaning products and shampoo usually resulted in mild symptoms unless aspiration occurred. In general, the toxicity of household cleaning agents (soaps, detergents, bleaches and other cleansers) are related to their irritant and caustic properties<sup>(11-13)</sup>. Soaps are emulsifications of fatty acids which may cause mild gastrointestinal and mucosal irritation. While detergents are more complex compounds, the toxicity of these products is also low, except for some that are very alkaline/caustic (eg automatic-dishwasher detergent). Most household bleaches contain less than 5% sodium hypochlorite, which causes moderate mucosal irritation. Granular bleaches are more toxic because they tend to be more concentrated and the granules prolong mucosal contact. More serious adverse effects are associated with lavatory cleaners (eg bisulphites), drain and oven cleaners (strong alkalis or acids), and general purpose cleaners (eg turpentine, pine oil). Household shampoos usually produce mild gastrointestinal tract irritation only, and most additive agents (eg selenium, salicylic acid) are not present in concentrations high enough to contribute to systemic toxicity.

Household insecticides are mainly carbamates and pyrethrum compounds<sup>(13)</sup>. In general, organophosphates are usually involved in significant poisonings, while carbamates produce similar but less severe effects. The clinical manifestations are due to excess acetylcholine from inhibition of the enzyme acetylcholinesterase. The symptoms can be summarised as muscarinic (including sweating, salivation, nausea, vomiting, diarrhoea, abdominal pain, urinary and faecal incontinence, bronchoconstriction) and nicotinic (including convulsion, coma, confusion, respiratory depression, muscle fasciculation and weakness, tachycardia,

hypertension or hypotension) effects<sup>(14)</sup>. Pyrethrums rarely produce symptoms when ingested. Rodenticides sold for household use usually contain hydroxycoumarin anticoagulant<sup>(13)</sup>. Prothrombin time should be checked initially, and prophylactic vitamin K may be required.

In summary, poisoning due to household products is common in Hong Kong. The majority of patients had relatively mild symptoms. Ingestion of "Dettol" liquid and strong corrosives tended to be associated with serious complications and deaths when compared with ingestion of shampoo or cosmetics. As with all poisoning, it is important that the airway is adequately protected before gastric lavage is performed.

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