



衛生署

Department of Health

Poisoning Watch

Volume 17, Number 1
May 2024

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Be vigilant towards heavy metal poisoning

Introduction

Heavy metals can be defined and characterized in various ways. Some, like copper and zinc, are essential nutrients that are required for various physiological and biochemical functions in the body and may result in deficiency diseases or syndromes if not in adequate amounts.¹ However, others, like mercury, lead, and arsenic, have no known benefit for health.

The environment contains both naturally occurring heavy metals and those released through anthropogenic activities. People may be exposed to small amounts of heavy metals through food, water, air, and commercial products. Each metal is different in where it is found and how it behaves in our bodies.

Some heavy metals can be toxic even at very low concentrations. They can damage and alter the functioning of organs such as the brain, kidney, lung, liver, and blood. Factors influencing the risk of toxicity include age, body weight, genetics, route of acquisition, duration of exposure, amount, preexisting health and nutritional status, etc. The symptoms and signs of heavy metal toxicity vary depending on the specific metal and can be a result of either acute exposure to large amounts or chronic exposure to repeated small quantities, which can result in cumulative toxicity.



衛生防護中心

Centre for Health Protection



Local clusters related to heavy metal poisoning

In Hong Kong, doctors can report poisoning incidents of public health significance to the Department of Health (DH) via the Central Notification Office (CENO). Upon receipt of notifications, investigation will commence immediately. Joint efforts from DH and other government departments might be required for comprehensive investigation and implementation of control measures.

From January 2021 to March 2024, the DH recorded a total of 12 heavy metal poisoning cases involving 8 females and 4 males, ranging in age from 18 to 66 years (median: 44 years). Mercury and lead were commonly involved and accounted for more than 80% of all heavy metal poisoning cases.

In this issue, we summarise two major heavy metal poisoning clusters received by the DH in recent years and provide advice on ways to reduce the risks of heavy metal poisoning.

Mercury poisoning

From late 2022 to early 2023, the DH received from the Hospital Authority (HA) a total of 5 mercury poisoning cases after using topical skin lightening products under the same brand name "Goree". The affected persons were all female domestic helpers from The Philippines aged between 34 and 45 years old. All of them presented with nephrotic syndrome. Mercury poisonings were confirmed by high mercury concentration in their urine. All affected persons revealed that they bought the topical skin products concerned from local retail stores or online shops. The duration of usage of the product ranged from 2 to 7 months. All of them presented to the Accident and Emergency Departments of public hospitals and required hospital care. All had remnants of the products used, which were sent to the HA Toxicology Reference Laboratory for chemical analysis. Excessive mercury were detected in all specimens. Press releases were issued by the DH on 2 November 2022 and 10 February 2023 to alert the public not to use these whitening cream products as they might contain excessive mercury, which was harmful to health. The Customs and Excise Department (C&ED) was informed for their investigation and follow-up action on tracing the stores selling the topical skin product.



Follow-up action was conducted by the C&ED. After testing by the Government Laboratory, the products concerned were confirmed failing to comply with the specific safety standard. The topical skin products concerned did not specify its mercury content on the label. Also, it was found that the packages of the products only bore warnings or cautions in English, without any Chinese warnings or cautions. As such, the products were in contravention of the Consumer Goods Safety Ordinance and its subsidiary legislation, the Consumer Goods Safety Regulation.



Figure 1: topical skin lightening product "Goree"

Skin lightening products are used by both men and women nowadays to lighten skin, fade freckles, blemishes, age spots, and treat acne. However, many consumers are unaware that some of these products might contain harmful chemicals, such as mercury, which poses significant health risks.² The Minamata Convention on Mercury has set a limit of 1mg/1kg (1 part per million) for mercury in skin lightening products.³ However, in 2017 and 2018, an overseas' study by the Zero Mercury Working Group (ZMWG) and Biodiversity Research Institute analysed 338 skin-lightening creams from 22 countries and revealed that approximately 10 percent of the creams contained mercury and had exceeded the permitted limit, with some containing up to 100 times the authorised mercury content.⁴ A recent ZMWG report released at the fifth meeting of the Conference of the Parties to the Minamata Convention on Mercury in October 2023 further revealed that, despite being banned by a global treaty, mercury-added skin-lightening products



were still sold by some of the world's biggest online retailers.⁵ Chronic exposure to mercury containing skin lightening cream can cause damage to the kidneys and nervous system. Symptoms may include proteinuria, oedema, tremors, irritability, insomnia, memory deterioration, concentration difficulty, impaired hearing and vision, and change in the taste function. In severe cases, renal failure may occur.

This poisoning cluster illustrated that there are health risks associated with purchasing beauty products of unknown composition or from doubtful sources that could be contaminated with mercury. When purchasing a skin product (especially for skin-lightening and freckle removing), members of the public are advised

- to purchase well-established brands from reputable stores;
- to check the product label to see if it contains mercury, which may be listed as mercurous chloride, calomel, mercuric, mercurio, or Hg;⁶
- not to purchase products containing mercury with concentration exceeding 1 part per million;
- to avoid products without proper label.

Lead poisoning

Lead poisoning can be caused by inhaling lead particles produced by burning materials containing lead, such as smelting, recycling, and stripping leaded paint. Ingestion of lead-contaminated dust, water from leaded pipes, food from lead-glazed or lead-soldered containers, certain traditional medicines, and hand-to-mouth behavior are also common sources of lead poisoning. Children, especially young ones, are especially susceptible to the harmful effects of lead exposure, which can have long-lasting and severe consequences on their brain and nervous system. Lead exposure can also have serious health implications for adults, including an increased risk of high blood pressure, cardiovascular issues, anaemia, liver and kidney damage. Pregnant women who are exposed to high levels of lead are at risk of experiencing miscarriage, stillbirth, premature birth, and low birth weight in their newborns.⁷

In December 2023 and January 2024, the DH was notified by HA about a family cluster of 3 lead poisoning cases.



The first case involves a 52-year-old woman who presented to the Accident and Emergency Department of a public hospital in December 2023 due to loss of consciousness. She had chest and epigastric discomfort 3 months prior to the presentation. She was found to have severe anaemia on admission. Extensive workup for anaemia revealed a dangerously high blood lead level. Her condition is stable after treatment and had been discharged.

The other two cases involve the first case's 52-year-old husband and their 18-year old son. In view of the first case's elevated blood lead level, they were both offered blood lead level screening and found to have elevated blood lead level. The duo reported to have no symptom and none required admission.

Upon thorough investigation, it was uncovered that a family member had purchased cans of lead-containing marine paint from outside of Hong Kong in mid-2023 to paint their yacht. Unfortunately, this paint was later misused in indoors to paint two bathroom doors in their residence, with no protective gear or assistance from professional renovation workers. To add to this issue, the dried paint was then polished with sandpaper. A vacuum cleaner without a high efficiency particulate air (HEPA) filter was used to clean up the paint dust. According to the relevant expert of the Hong Kong Poison Control Centre of the HA, the source of lead accounting for this poisoning cluster was the paint dusts. Manual sanding could generate dusts with sizes in the nanometer to micrometer range. An ordinary household vacuum cleaner could not retain dusts of such small sizes. To make things worse, every vacuum-cleaning could make them air-borne again, spread them further and facilitate repeated inhalational exposure by people in the household.

Hazardous lead dust and chips can be originated from indoor sources like lead-based paint being scraped, sanded, or heated during home repair tasks.⁸ Lead dust and paint chips can contaminate surfaces and objects that come into contact with people. Additionally, when the home is vacuumed or swept, settled lead dust can be stirred back into the air. Lead dust is odorless and can be easily inhaled, resulting in higher levels of lead absorption in the body compared to swallowing or skin absorption.⁹ As a result, lead can build up in the body, causing health risks even with minimal exposure over time.

This poisoning cluster illustrated that there are health risks associated with the misuse



of lead-containing marine paint which is not intended for domestic use, complicated by the lack of awareness of lead-safe work practices, such as containing dust inside the work area, using dust-minimising work methods and conducting a careful cleanup. Home renovators can create lead hazards without realising it. If lead-containing paint is not handled properly, lead dust and paint chips can remain in the home for years after the work is completed. Paint removal by blasting, burning, dry scraping, dry sanding and using power tools creates the most serious dangers because the particles are small enough to be inhaled or deposited in furnishings or carpet, making complete removal extremely difficult.¹⁰

When planning to do any do-it-yourself (DIY) renovation, members of the public are advised to-

- purchase paint and materials of well-established brands from reputable stores;
- check the paint products label and their intended use to avoid misuse of the products;
- for renovation work with lead containing materials, follow lead-safe work practices such as containing work area to prevent dust escaping into rest of your home, wearing appropriate protective gear, cleaning the work area by using disposable wet wipes and washing your hands and face every time after the renovation work.¹¹

General advice to the public on prevention of heavy metal poisoning

- Members of the public should not buy products of unknown or doubtful composition, or to consume products from doubtful sources.
- The import and sale of consumer goods in Hong Kong are controlled by relevant legislations. It is an offence to supply, manufacture or import into Hong Kong consumer goods unless the goods comply with the general safety requirements for consumer goods.
- Prior professional advice should be sought if renovation materials rich in heavy metals, such as industrial paint, are to be purchased and used for individual purposes.



- When planning any DIY renovation, repair, or painting project, members of the public are advised to follow the lead-safe work practices.

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