

# Case Report: Cyanide in a Fatal Herbal Drink: An Exhumation Case Study

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## ABSTRACT

**Background:** Traditional herbal drink, Jamu, is popular among Javanese. This paper reports two cases of death after taking a slimming Jamu. Interestingly, an illegal love affair was involved in this the case too.

**Case Report:** The first victim (victim 1), a female, rapidly convulsed and died after taking a slimming Jamu drink. However, her brother (victim 2), after tasting just a small amount of that Jamu, rapidly became convulsive and unconscious. Although, he was immediately brought to hospital, he died before receiving any treatment. Because the death was unnatural, he was sent to the Department of Forensic Medicine for investigation. His sister was buried without any medico-legal examination, but later on the exhumation was performed. In autopsy, the victim 1 was found pregnant. Both victims had no injury on their bodies. Evidence of cyanide was positive in tissue samples, but negative in the control sample (soil).

**Conclusion:** Both victims had the same cause of death, which was cyanide poisoning. The manner of death was suspected as homicide.

## 1. Introduction

Nowadays, more and more people use traditional medicines [1, 2]. Javanese traditional drink, called Jamu, is a kind of drink made from herbal ingredients. Jamu has long been, and still is very popular among people in Indonesia, especially Javanese. Jamu is generally prepared based on the experience of the users for decades or even hundreds of years. People believe that it can cure certain diseases or relieve some symptoms. Recently, many researchers have studied the

scientific reasons of the herbal remedies used for Jamu, and investigate their immunology mechanisms for certain diseases.

Blended herbal medicines as well as single herb medicines comprise a large number of constituent substances which exert effects on human physiology through a variety of biological pathways. The KNApSAcK Family database systems can be used to comprehensively understand the medicinal usage of plants based upon traditional and modern knowledge [3-5].

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There are many varieties, formulas and applications of Jamu covering not only human health, but also cosmetics, such as body slimming, skin whitening, hair treatment, body smell refreshments, and so on. Traditional Jamu is composed of many natural herbs, while some modern herbal medicines are made from synthetic alchemical compounds. As a result, traditional Jamu has relatively fewer side effects than modern medicine. In other words, Jamu has no alcohol, no narcotics, and no side effects. However, Jamu sometimes has some added substances to increase the remedial effects, such as honey, raw egg, or wine/alcohol. Although a herbal medicine itself does not contain poison, sometimes the additional substances may have a toxic or dangerous effect.

Cyanide is a rapidly acting and powerful poison, mainly used in the electroplating and metallic luster industries as potassium cyanide or sodium cyanide [6]. Certain fruit stones, like apricots or peaches, have cyanide in the form of cyanogenic glycosides, also hydrogen cyanide is found in exhaust from vehicles, tobacco smoke or in combustion gas when nitrogen-containing polyurethane is burnt [7, 8]. Furthermore, the blood of a patient who intravenously received sodium nitroprusside, an anti-hypertensive drug, in clinical applications has cyanide [6].

The acute toxic effects of ingestion or inhalation of cyanide due to suicidal or homicidal attempts [8-12] or inhalation of combustion gas in a fire [13, 14] are generated by the process of transferring cyanides through the blood and then bounding to ferric iron of cytochrome oxidase to inhibit electron transport and disrupt cells respiration, resulting in hypoxia and suppression of physiological function [15, 16]. The biological process of intracellular poisoning by cyanide intoxication occurs because cyanides are mostly concentrated in the red blood cells and bound to methemoglobin. Fatal oral doses for adults are 0.2 g for cyanide potassium and 0.3 g for cyanide sodium, and 1.2–5 mg/kg for children [13, 17].

## 2. History

The first victim (victim 1) was a married young female. She attended a family gathering party. A Jamu seller came to the house and brought a bottle of slimming Jamu which was ordered as a gift for the victim. After receiving the gift, she immediately entered her room to drink it. But suddenly, the family was shocked by her scream, and they saw her fall down on the floor and started vomiting. Her brother was curious about Jamu, and tasted a little bit of it, but soon he convulsed and fell unconscious. The family became panicked, and called the police. Two

policemen soon arrived the scene and tried to smell the bottle of Jamu, that ended in their loss of consciousness. The victim's brother (victim 2) and two policemen were immediately brought to the hospital. Both policemen survived but were hospitalized due to this incident. However, the victim 2 died before getting any medication, with the cause of death unknown. To investigate the cause of death, the brother was sent to the Department of Forensic Medicine of Dr Sardjito Hospital for medico-legal autopsy. On the other hand, the sister was buried according to her religion and culture immediately after her death, without prior forensic examination.

## 3. Examination

### Victim 2

The second victim was male, 17 years old, moderate build with 70 kg weight and 164 cm height. Rigor mortis was observed in all joints; postmortem lividity was observed on the back surface of the body with red-light color, which disappeared after finger pressure. A foamy-red liquid was found flowing through his mouth. The mucosa of the lips and gingiva were cyanotic. The tongue was in cyanotic color and not protruded. No injury was found on the body. On dissection it was revealed that all internal organs were in cyanotic condition and congested. There was neither intracranial hemorrhage nor injury. The laboratory examination investigation determined the presence of cyanide in his body.

### Victim 1

The first victim was planned for exhumation after the investigation determined that the cause of her brother's death was cyanide poisoning. Two weeks after her death, the body was exhumed. The victim was female, 30 years old, with 154 cm height. The body was decomposed. The mucosa of the lips and gingiva were cyanotic. The tongue was in cyanotic condition and not protruded. No injury was found on the body. On dissection, all internal organs and intracranial areas showed no pathological changes, except decomposition. Surprisingly, after opening the peritoneal cavity, the uterus was bigger than that in a normal woman, with 18×14×3.5 cm in size, without any injury nor hemorrhage. There was an amniotic sac with the conception product inside. The fetus was 14 cm in length and weight 76 g (Figure 1). Toxicological examination identified cyanide in her body. The sample soil of the burial and its environment, as control, were negative of cyanide.



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Figure 1. A fetus found in the victim's uterus

#### 4. Discussion

Slimming products, such as Jamu is a popular drink especially among women. They are said to significantly reduce body weight in a short time. However, many reports exist about side effects of slimming agents, such as dehydration, cardiac disturbance, and so on. In the beginning of this case, it was speculated that her death was accidental due to the side effect of slimming Jamu. However, after cyanide was determined as the cause of her brother's death, the investigation of the sister's death case was started by exhumation. After examination, it was confirmed that the cause of her death was also cyanide. The case got especially interesting when the autopsy investigation found that the victim was pregnant.

The victim 1 was married and her husband worked abroad, and usually came back home only once a year. However, they still kept in touch, and the husband always sent her a regular amount of money. She had a child and lived with her parents. The family was shocked of her death, because her husband had informed them that he would return home to visit her in the following two weeks. However, she had died before seeing her husband again.

Her pregnancy was questioned because her husband was away for about 1 year. The police investigated the records from her cell phone and discovered that the person, who ordered the slimming Jamu for her, was her friend from elementary school that made him as the suspected person. He had sent a short message, asking the

victim to receive the slimming Jamu and drink it. He said that the victim had gained weight and in order to restore her beauty and be prepared before her husband return, she should consume the slimming Jamu.

Actually, he was suspected to have a love affair with the victim, which resulted in her pregnancy. After noticing that her husband will return, he wanted her to abort the infant. So, he put some rat poison in the Jamu. He felt guilty of her pregnancy and panicked because her husband will soon come back home. Apparently, he only wanted the fetus be aborted, but not to kill the victim. However, the poison killed both mother and fetus, and unexpectedly mother's brother and nearly two policemen.

Cyanide is widely used in industrial and laboratory processes. The toxicity of cyanide is well described in humans with rapid inhibition of cellular aerobic metabolism after its ingestion or inhalation, leading to severe clinical complications which are frequently lethal [18, 19]. Cyanide poisoning has most frequently been absorbed by ingestion or inhalation of toxic fumes. It has been reported as the cause of death in a number of cases involving suicidal, homicidal and accidental ingestion. In Sri Lanka, accidental poisoning is usually occupation related.

Exhumation, which was performed two weeks after the first victim's death, seemed to be too late. The sister should be immediately sent for autopsy when the death was suspected unnatural [20]. However, in Indonesia, a death certificate can be issued by a non-medical person, such as the chief of a village. They just simply report that one of the family members has passed away, and then the certificate of death will be issued. Second, deceased examination is uncommon, and people hate the invasive dissection involved with autopsy.

In many cases, exhumation was performed because there was no deceased examination before burial in an unnatural death. However, verbal autopsy may help in this situation to identify the unnatural death to be sent for medico-legal autopsy. Furthermore, in Yogyakarta, the initial medical form of the death certificate can easily be abused because it does not mention the cause of death. Some believe that the cause of death should be kept for medical confidentiality; however, there is no law or regulation to keep the cause of death confidential. According to WHO recommendations, the death certificate should mention the cause of death; however, in Yogyakarta the certificate is issued only for patients died in a hospital for internal uses, and is never sent to their family.

## 5. Conclusion

After medico-legal autopsy, we concluded that the causes of deaths were cyanide poisoning, and the manner of death was homicide. Medico-legal examination is very important to investigate the cause and manner of death, and should be performed immediately in all unnatural deaths.

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## Conflict of Interest

The authors declared no conflicts of interest.

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