Evidence of mercury exposure in a particular low-income community in South Africa

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Small-scale gold miners are generally unaware of the dangers of mercury. A lack of capital further contributes to health and safety being ignored during operations. There is a need to conduct public health awareness campaigns among small-scale miners on the handling of mercury.

**BACKGROUND**

South Africa relies mainly on coal for its energy needs. In addition, the country has a large gold mining industry. As small-scale gold miners are generally unaware of the dangers of mercury, there is a need to conduct public health awareness campaigns among small-scale miners.

**METHODS**

A CSIR study determined the extent of mercury exposure in a community close to mercury sources. The study was conducted in a low-income community in South Africa.

**RESULTS AND DISCUSSION**

Potential sources of exposure

**Domestic exposure**

- The following results were found:
  - The concentrations of total mercury in the water (maximum 3.81 ng/l) were below guideline values for South Africa (water guideline: 1 μg/l).
  - The concentrations of total mercury in fish (maximum 0.34 μg/g) were below the World Health Organization's guideline for mercury in fish tissue: 0.5 μg/g.
  - Only 20% (6 out of 30) of respondents used coal for cooking.
  - It was therefore unlikely that exposure was from indoor coal combustion or consumption of water and fish from the river.

**Health effects in participants**

Symptoms associated with mercury exposure were also detected in participants with elevated mercury levels in their blood or urine (Table 1).

**Occupational exposure**

Levels of mercury in urine and blood samples were compared to the South African guidelines for individuals who are not exposed to mercury in the workplace.

**Conclusion**

The small-scale miners are generally unaware of the dangers of mercury. A lack of capital further contributes to health and safety being ignored during operations. There is a need to conduct public health awareness campaigns among small-scale miners on the handling of mercury.

**REFERENCES**


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*Presented at the CSIR Natural Resources and the Environment conference, Pretoria, 2001.*

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**Table 1:** Prevalence of symptoms experienced by respondents with elevated mercury levels.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Prevalence among respondents with elevated mercury levels (%)</th>
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<tbody>
<tr>
<td>Metallic taste in mouth</td>
<td>14.3%</td>
</tr>
<tr>
<td>Headache</td>
<td>28.6%</td>
</tr>
<tr>
<td>Loss of appetite</td>
<td>14.3%</td>
</tr>
<tr>
<td>Joint pain</td>
<td>9.5%</td>
</tr>
<tr>
<td>Numbness</td>
<td>9.5%</td>
</tr>
<tr>
<td>Sleep problems</td>
<td>42.9%</td>
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<tr>
<td>Loss of concentration</td>
<td>14.3%</td>
</tr>
</tbody>
</table>

The question therefore remained: What was the cause of the mercury exposure? The high unemployment rate and low level of schooling (51.7% of participants had no schooling or other education) together with the desire to earn a living from small-scale gold mining is a potential contributor to mercury exposure.

Small-scale gold mining provides an important source of livelihood for communities in regions where economic alternatives are limited. Small-scale mining, although often conducted in below-standard environmental and occupational health conditions, has the potential to empower disadvantaged communities.

**Figure 1:** Droplets of metallic mercury.

**Figure 2:** Participants drew water from the river for consumption.

**Figure 3:** Water and fish samples collected for mercury analysis.

**Figure 4:** Concentrations of mercury per urine sample. The guideline is in red.