

EDITORIALS

Don't Be 'Mis-led': Few Herbal Products have Been Implicated in Lead Poisoning

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J Gen Intern Med 24(11):1259-60

DOI: 10.1007/s11606-009-1106-6

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The Beuttner study¹ in this issue of JGIM used NHANES data to draw an association between lead levels and the use of herbal supplements, but the findings should raise more caution about interpretations than herbs. Although geometric means of blood lead levels were 10% higher among women who used herbs, compared to nonusers, all geometric means were low. Only 0.6% of the population had elevated (>10 mcg/dL) blood levels and the authors provide no evidence that elevated lead levels were more common in users of herbs. Increased lead levels, even if statistically significant, are of questionable clinical significance when levels remain in the low-normal range. As the authors note, men had higher blood lead levels than women, and although the use of supplements was similar in men and women, no association between lead levels and herb use was found among men.

A limitation of the current study, which the authors acknowledge, is that information on occupation (the primary source of exposure in adults) was not available. Occupational and recreational exposures to lead include cable splicing, manufacturing, construction, mining, welding, painting, working with batteries, pottery, dyes, stained glass or jewelry; and metal extraction (especially gold).² Childhood lead poisoning has been associated with kohl, surma, or other traditional black eye makeup applied to children. Other unusual exposures include home smelting of batteries or electrical wiring, and exposure to lead ammunition, including respiratory exposure in inadequately ventilated indoor shooting ranges³.

The classification of herbal products in the Beuttner study is idiosyncratic; why examine echinacea, ginkgo and St. John's wort (*Hypericum perforatum*) separately and then lump the hundreds of herbs (and potentially thousands of combinations) in the Chinese and Ayurvedic pharmacopoeias into a single category? And calling eleuthero (*Eleutherococcus senticosus*) a ginseng constitutes fighting words to the botanically literate. True ginsengs are *Panax* species, including, for example, American ginseng (*P. quinquefolius*) and Chinese ginseng (*P. ginseng*). Eleuthero and ginseng are in the same family (Araliaceae), but daisies and thistles are similarly related (Asteraceae). Such distant cousins may be, and in this case are, quite dissimilar.

These remarks are not meant to diminish the importance of heavy metal contamination of herbal products, which is certainly of concern. Lead has been found in specific products

and may come from the soil the plants were grown in; contamination during growing, processing, or transport; or therapeutic addition. Some Latinos use *greta* (lead monoxide), *albayalde* (lead carbonate), or *azarcon* (lead tetroxide; also called *alarcon*, *coral*, *luiga*, *Maria Luisa*, or *rueda*) to treat *empacho*. A folk illness characterized by vomiting and diarrhea, *empacho* is believed to be caused by food stuck in the intestine⁴. *Greta* and *azarcon* may contain up to 90% lead⁴; *litargirio*, a remedy used in the Dominican Republic as a deodorant, fungicide, and burn treatment, can contain up to 79% lead⁵.

In some cases it is unclear whether lead is a contaminant or added deliberately. Heavy metals have been found in both Ayurvedic and Chinese herbal preparations. Twelve cases of lead poisoning attributed to Ayurvedic medicines were reported to the CDC over a four year span.⁶ Lead may be added with therapeutic intent. Cinnabar (mercuric sulfide) is rarely used today in traditional Chinese medicine, but this remedy was once used more widely as a sedative⁷.

Western physicians scoff at such use, but heavy metals can indeed have therapeutic as well as toxic effects. Salvarsan, an arsenical, was the most effective treatment against syphilis until penicillin was introduced in the 1940s⁸. Potassium arsenite, an arsenic compound, was the first chemotherapy, introduced to treat leukemia in 1865 and used until the 1950s. Arsenic may be an oldie but a goodie; in the 1970s, Chinese scientists tested an arsenic and mercury-containing mixture based on a traditional remedy and found it effective against acute promyelocytic leukemia (APL). The active compound eventually proved to be arsenic trioxide, which has since shown success in inducing remission in patients with APL. Both organic and inorganic arsenic compounds are now being tested against various cancers⁸.

Lead may also be introduced into a preparation during processing, for example through leaded vessels, or lead-containing water. The use of lead-containing gasoline, still common in many countries, can also contribute to contamination; herbs that are dried near roads may pick up a veneer of heavy metals.

Current or prior use of leaded gasoline can contaminate soil with lead. Different plants have different affinities for different compounds, and some plants preferentially concentrate lead in the soil. This property has been used for decontaminating land. Toxic sites can be planted with crops that concentrate heavy metals; mature plants, and the metals they absorb, are then removed from the site and disposed of, a process called phytoremediation.⁹ Repeated plantings over many years may be necessary, but the process is very cost-effective. Lead-concentrating plants include alfalfa (*Medicago sativa*)¹⁰, one of the herbs mentioned in the Beuttner study.

Members of the *Brassica* family, which includes cabbage, broccoli, cauliflower, and Brussels sprouts, also accumulate

lead; Indian mustard (*Brassica juncea*), a food plant, has also been used in phytoremediation.¹¹ Perhaps we should be testing produce, as well as herbs, for heavy metals.

Buettner et al. state that the fact that garlic users did not have higher lead levels supports the "specificity of the association between specific herbal supplement use and blood lead levels", but the authors appear to be unaware that garlic, as well as a constituent, allicin, actually decreases lead burden in rats, mice, and sheep.¹²⁻¹⁵ Cilantro (*Coriandrum sativum*) also reduced lead deposition in exposed mice¹⁶. These harmless herbs should be tested in humans to see whether an oral chelating effect is demonstrated.

An inverse effect of calcium supplementation on lead levels is consistent with previous findings; randomized controlled trials have found that calcium supplementation reduced lead levels in pregnant^{17,18} and lactating women¹⁹. The chelating effects of calcium should provide more motivation to clinicians to recommend calcium supplementation in both children and adults.

Mean lead levels in a population sketchily surveyed on the dose, duration, and details regarding intake of specific herbs cannot rationally be used to demonstrate lead concerns regarding specific herbs. Whether specific products contain problematic amounts of lead, alas, must be established through the analysis of specific herbal products, or the blood of those who take them. There is fascinating literature on the bioaccumulation of various heavy metals by specific plants, as well as the possible use of some herbs as chelating agents. More research is needed on lead levels in plants used for food or medicine. In the meantime, let us not use too broad a brush to tar all herbal products.

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