PRO1618: Mitigating Arsenic Related Health Problems in Bangladeshi Populations by Introducing High Selenium Lentils Into the Everyday Diet

The objective of the study was to perform a double-blind, randomized controlled trial to determine whether consumption of high versus low-selenium (Se) lentils, will reduce the body burden of arsenic (As) and decrease toxicity in a Bangladeshi population chronically exposed to As through their natural water sources and food. A clinical trial was conducted in Shahrasti, Chandpur District, in rural Bangladesh from October 2015 to Sept 2016 in which 400 people known to have high As in their drinking water (16X - 78X the WHO recommended safe level of 10 ppb), received either high or low selenium lentils which they ate daily, for 6 months. A series of health examinations, questionnaires and biological samples were collected over the 6 months dietary trial. The rationale of the study is that Selenium is antagonistic with As, both elements promoting each others' excretion from the body. In contrast with high As in the water, the soil in Bangladesh is deficient in selenium. Se content of soil in Saskatchewan, Canada, is high but at non-toxic levels, and transfers into lentils grown on these soils. Lentil, a staple food in Bangladesh, is a high protein food that is eaten daily. We hypothesized that incorporation of high Se lentils into the daily meals of As-exposed families will reduce negative health effects from chronic As toxicity. The whole food approach can provide inexpensive, uncomplicated, nutritionally beneficial relief. No adverse health effects of high- or low-Se lentil consumption were observed in the participants throughout the trial. After completion of the major analyses for the major trial outcomes, i.e., As excretion in urine and feces, and As deposition in hair the treatment groups were unblinded. The findings demonstrated significantly higher urinary excretion of As in the high-selenium lentil group. Change in As methylation (how the body is dealing with the toxic arsenic) in the high-selenium lentil group was also observed as evident by the excreted urinary As metabolites. Selenium levels in blood increased significantly in participants who consumed the high-Se lentils. Women in the high-selenium group exhibited lower total cholesterol levels at 3 months of the trial, and men in that group had a significantly higher HDL cholesterol proportion, which is considered the "good" cholesterol.