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BACKGROUND

Suriname, an upper middle-income Caribbean country, faces a triple public health burden: high perinatal mortality, environmental contamination with mercury and pesticides, and a lack of environmental policies. The Caribbean Consortium for Research in Environmental and Occupational Health (CCREOH) examines the impact of exposures to neurotoxicants in 1000 mother-child dyads on birth outcomes and pediatric neurodevelopment (Figure 1).

RESULTS

The mean age of the women (n=801) was 28.4 years. Most women were of creole descent (26.5%), followed by hindustani's (22.7%), tribal peoples (20.3%), people of mixed descent (13.4%), javanese (9.3%), indigenous (7.3%) and Caucasians (0.5%).

Hair Hg levels of women living in the interior were significantly higher than in Paramaribo or Nickerie ;p<0.001 (Figure 3).

Pesticide residue analysis of selected crop items cultivated in Suriname showed the presence of endosulfan and lindane in the leafy vegetable tannia (*Xanthosoma brasiliense*)³. The LoCs for these pesticides in tannia show that in the worst case scenario the highest measured residue level is below the LoC (Figure 5).

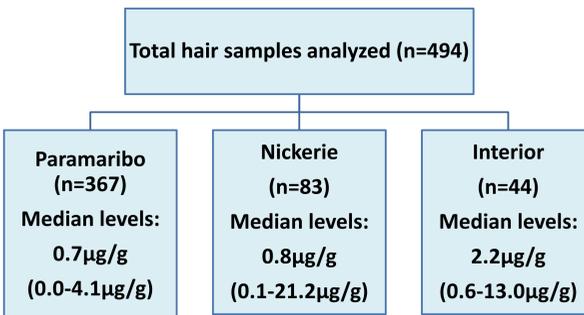
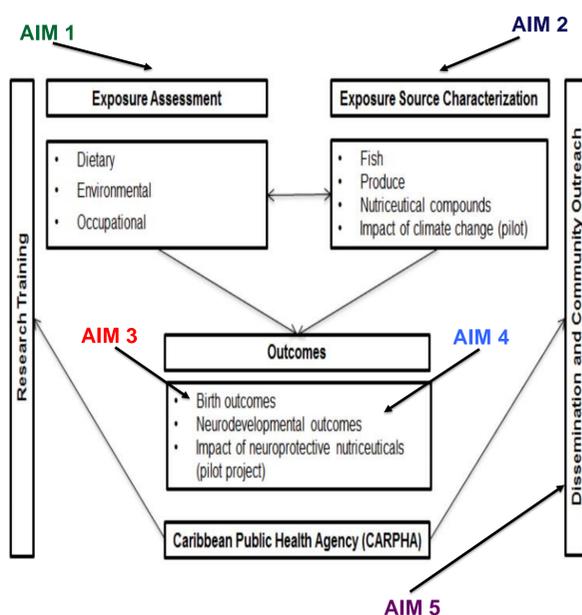


Figure 3. Hair mercury levels by place of residence

Adverse birth outcomes (intra-partum, intra-uterine death, still birth or miscarriage, APGAR score <7, congenital abnormalities, low birth weight (<2500g), preterm birth) were more frequently observed in women with high hair Hg levels (Table 1).

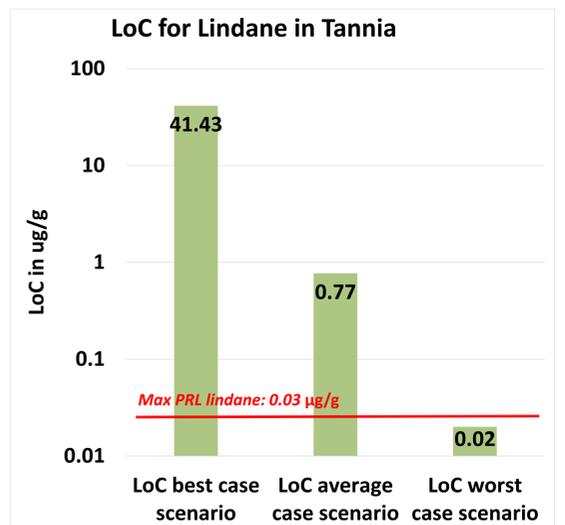
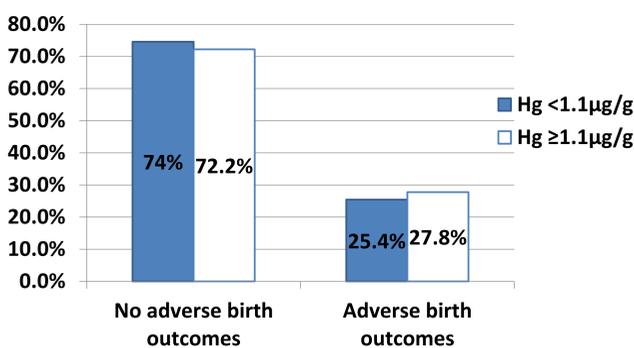


Figure 5. Level of Concern of lindane in tannia

25.7% of the women (n= 556) had EPDS scores ≥12. Multivariate analysis showed that women with lower secondary education or less were 2x likely to have EPDS scores ≥12 compared with higher educated women (OR 1.95; 95% CI 1.28-2.97).

Figure 1. CCREOH research overview

Table 1. Hg exposure (hair samples) and adverse birth outcomes



Estimated blood Hg levels of the women (derived from hair Hg levels) were higher than blood Hg levels in study cohorts from the USA^{1,2}. Levels of women in the interior exceeded USEPA action level of 5.8 µg/L (Figure 4)

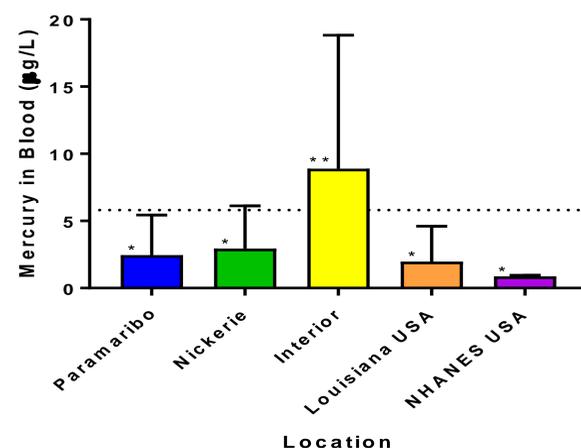


Figure 4. Estimated blood Hg levels in Surinamese women

METHODS

Environmental epidemiologic cohort design, examining the cumulative impact of chemical and non-chemical stressors on birth outcomes and early childhood neurocognitive development. Recruitment sites: Paramaribo, Nickerie, interior. Environmental assessments: Hg, organophosphate pesticides; biospecimen analysis (blood, urine, hair, saliva, cordblood) and psychosocial questionnaires administered at selected trimesters. Neurocognitive (the Bailey test) and biospecimen analyses at child ages 12, 24, 26, and 48 months (Figure 2)

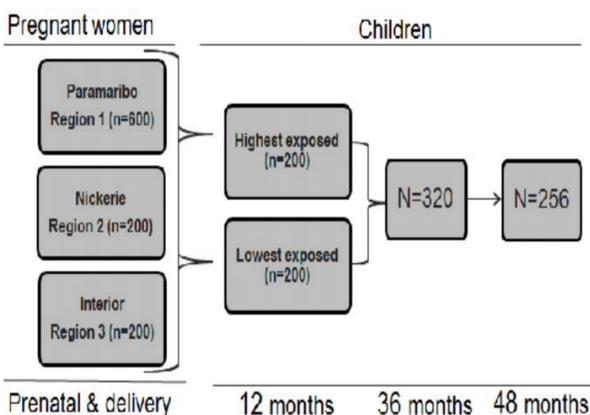


Figure 2. CCREOH cohort design

DISCUSSION

The significantly elevated hair Hg levels of the women living in the interior compared to those residing in the other study regions is most likely attributed to a higher consumption of Hg contaminated fish.

The estimated blood Hg levels based on hair Hg levels are of public health concern, especially for women living in the interior. Blood Hg analyses are in progress.

Despite the small sample size, residues of two widely prohibited pesticides were identified in the popularly consumed leafy vegetable tannia.

The research findings are contributing to the assessment phase of Suriname's compliance to the Minamata Convention

CONCLUSIONS

Analysis of fish consumption data will inform the assessment of the dietary exposure to Hg as well as the nutritional properties

A more comprehensive sampling and analysis of produce from Suriname as well as a cumulative health risk assessment is warranted

The environmental and health data collected through CCREOH are pivotal to the development of a comprehensive national environmental health policy in general, and those tailored to Hg and pesticides, specifically

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