

Association between Organochlorine Pesticide Levels in Taiwanese Breast Milk and their Reproductive Effects

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Background/Aim

Human exposure to organochlorine pesticides (OCPs) has been studied in correlation to reproductive disruptions. However, few studies have focused on the associations between human exposure to OCPs and female reproduction in Taiwan. Our goal is to examine breast-milk OCPs and their associations with female infertility and gynecological diseases.

Methods

The breast milk samples were collected in southern Taiwan (n = 68) from 2013 to 2016. The OCP residues in the breast milk were analyzed using high resolution gas chromatography with low resolution mass spectrometry (HRGC/LRMS) after extraction, concentration, and cleanup.

Results

The results show that the most abundant OCP residue in the breast milk was 4,4'-dichlorodiphenyltrichloroethylene (4,4'-DDE), with a geometric mean \pm standard deviation of 8.07 ± 6.53 ngg⁻¹ lipid⁻¹. Certain OCP residues were significantly associated with demographic parameters, including age, pre-pregnant body mass index (BMI), annual incomes, population, birth year, and parity (p < 0.05). The logistic regression showed that the odds ratio (OR) of log γ -hexachlorocyclohexane (γ -HCH) was higher for mothers who received medical treatment for infertility than for the normal group (OR = 25.6, p = 0.035) after the adjustments of age, pre-pregnant BMI, annual income, population (i.e., native-born Taiwanese), birth year, and parity. In principal component analysis, cis-chlordane (cis-CHL) and γ -HCH were found to be related to participants who received medical treatment for infertility and 4,4'-DDT was associated with those who received gynecological surgery.

Conclusions

Among the investigated OCPs, HCH exhibited a probable association with infertility diseases for Taiwanese women.

Keywords: organochlorine pesticides; breast milk; breast-feeding; infertility; female reproduction