Birth Weight, Head Circumference, and Prenatal Exposure to Acrylamide from Maternal Diet: The European Prospective Mother-Child Study (NewGeneris)

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Abstract

Background: Acrylamide is a common dietary exposure that crosses the human placenta. It is classified as a probable human carcinogen, and developmental toxicity has been observed in rodents.

Objectives: We examined the associations between prenatal exposure to acrylamide and birth outcomes in a prospective European mother-child study.

Methods: Hemoglobin (Hb) adducts of acrylamide and its metabolite glycidamide were measured in cord blood (reflecting cumulated exposure in the last months of pregnancy) from 1101 singleton pregnant women recruited in Denmark, England, Greece, Norway and Spain, 2006-2010. Maternal diet was estimated through food-frequency questionnaires.

Results: Both acrylamide and glycidamide Hb adducts were associated with a statistically significant reduction in birth weight and head circumference. The estimated difference in birth
weight for infants in the highest versus lowest quartile of acrylamide Hb adduct levels after adjusting for gestational age and country was -132 grams (95% confidence interval (CI): -207, -56); the corresponding difference for head circumference was -0.33 cm (95%CI: -0.61, -0.06). Findings were similar in infants of non-smokers, were consistent across countries, and remained after adjustment for factors associated with reduced birth weight. Maternal consumption of foods rich in acrylamide, such as fried potatoes, was associated with cord blood acrylamide adduct levels and with reduced birth weight.

**Conclusions:** Dietary exposure to acrylamide was associated with reduced birth weight and head circumference. Consumption of specific foods during pregnancy was associated with higher acrylamide exposure *in utero*. If confirmed, these findings suggest that dietary intake of acrylamide should be reduced among pregnant women.


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