Intrauterine nicotine exposure, birth weight, gestational age and the risk of infantile colic. Does central nervous system development play a role in infantile colic?

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Background
Crying infants concern many mothers and some seek help or advice from the health care system. The situation is often called infantile colic.

Little is known about the etiology of infantile colic, but the condition has been associated with prenatal tobacco exposure and low birth weight. Nicotine acts as a neurotransmitter and is known to affect the intrauterine central nervous system development, while low BW and premature birth have both been related to adverse neurodevelopmental outcomes.

Aim:
To investigate the association between intrauterine nicotine exposure, birth weight (BW), gestational age (GA) and infantile colic in a large cohort study.

Materials and methods:
We included 63,128 and 62,761 live born singletons from the Danish National Birth Cohort (1997-2002) in the nicotine exposure and the BW and GA study respectively. Infantile colic was defined according to the modified Wessel’s criteria based on maternal interview at 6 months postpartum. Information on nicotine exposure and other covariates was derived from maternal interviews during pregnancy. Information on BW and GA was derived from the Danish Medical Birth Registry. Risk of infantile colic was calculated as odd ratios (OR) with 95% confidence intervals.

“Rule of three” (Wessel M.A., 1954)
Infantile colic is defined as paroxysms of irritability, crying and fussing for a total of more than 3 hours per day, for more than 3 days in a week and for more than 3 weeks in an otherwise healthy and well-fed infant.

Results

1. Nicotine exposure
Eight groups were created according to number of cigarettes smoked per day (in 4 groups), and the use of nicotine replacement therapy (yes/no) (reference: 0 cigarettes and no use).
An increased risk of infantile colic was found for infants exposed to nicotine from any source.

2. Birth weight
BW was categorized in 500 grams intervals (reference: 3,500-4,000 grams). An increased risk of infantile colic was found with lower BW.

3. Gestational age
GA was categorized in 5 groups (reference: gestational week 40). An increased risk of infantile colic as found with lower GA.

4. Small for gestational age (SGA)
Ten groups were created according to GA (in 5 groups) and SGA status (below/above 10th percentile of BW for GA) (reference: gestational week 40 and non-SGA). Being SGA was associated to infantile colic among infants born in gestational weeks 32-40.

Conclusion
Exposure to nicotine from any source, low birth weight, preterm birth and being small for gestational age among late preterm and full term infants increased the risk of infantile colic.

All these factors are associated to neurodevelopment. Our findings support the hypothesis that the central nervous system development may be involved in the pathogenesis of infantile colic.