

ASHES, Vol. 8(4) - Not yet born and already too late? The relationship between prenatal nicotine exposure and future smoking behavior

April 25, 2012

Prenatal nicotine exposure is associated with a range of consequences. These consequences might include brain changes that lead to increased risk for developing tobacco use later on in life (Slotkin, Tate, Cousins, Seidler, 2006). Previous studies have identified a complicated web of risk factors influencing future nicotine usage (e.g. genetics, social and media influence, and parental postnatal smoking; Rydell, Cnattingius, Granath, Magnusson, Galanti, 2012). This week, the BASIS explores the role of parental nicotine use and fetal nicotine exposure within this web of risk factors (Rydell et al., 2012).

Methods

- Researchers utilized a longitudinal dataset collected among Swedish school children from 11 to 18 years old.
 - The original study consisted of a baseline and six yearly follow-up questionnaires on tobacco use, nicotine cravings, and withdrawal symptoms.
 - The participants' parents also reported cigarette and chewing tobacco use during and after pregnancy.
- Researchers categorized parental tobacco use into four categories, depending on parental self-report:
 - No parental exposure.
 - Maternal tobacco exposure only [\[1\]](#).
 - Paternal smoking only.
 - Exposure from both parents.
- Researchers created separate models for boys and girls predicting participant tobacco use, cravings, and physical withdrawal based on

parental tobacco use category.

- Researchers controlled for several confounding variables, including parental education, socio-economic status, and postnatal tobacco exposure.

Results

- Researchers found no association between parental tobacco use and tobacco consumption outcomes among boys.
- Among girls, however, exposure from both parents, and maternal only exposure was significantly related to heavy tobacco use [2], nicotine dependence, and withdrawal symptoms at age 17.

	Heavy Smoking		Cravings		Withdrawal Symptoms	
	Boys	Girls	Boys	Girls	Boys	Girls
No parental use	1.00	1.00	1.00	1.00	1.00	1.00
Paternal-only exposure	1.11 [0.70-1.76]	0.89 [0.53-1.52]	0.72 [0.41-1.23]	0.74 [0.42-1.32]	1.62 [0.88-3.04]	0.83 [0.45-1.53]
Maternal-only exposure	0.98 [0.57-1.70]	2.12 [1.20-3.75]	1.14 [0.56-2.38]	2.45 [1.17-5.54]	1.86 [0.80-4.62]	2.30 [1.06-5.34]
Both-parent exposure	1.56 [0.96-2.53]	1.90 [1.15-3.13]	0.87 [0.50-1.51]	2.24 [1.22-4.29]	0.99 [0.54-1.83]	3.28 [1.66-6.94]

Table displays odds ratios. 95% confidence intervals follow in square brackets.

Bolded numbers are statistically significant.

All odds ratios are adjusted for parent education, socio-economic status and postnatal smoking.

Figure. Summary of associations between parental tobacco use and outcome measures at age 17. Click image to enlarge.

Limitations

- The study relied solely on self-report for participant's tobacco use and dependence.
- The study relied on retrospective reports of parental tobacco use during pregnancy.
- The measure for parental tobacco use did not take into account the level of exposure, only whether it was present or absent.

Conclusions

There is a clear and robust association between maternal-only and both-parent exposure on heavy tobacco use, cravings, and withdrawal symptoms for adolescent girls, but not for boys. The reason behind this association is not immediately clear; hypotheses suggest that the female brain might be more vulnerable to brain changes from tobacco (Levin, Lawrence, Petro, Horton,

Seidler, Slotkin, 2006). Other hypotheses suggest female hormones might modulate the effects of prenatal tobacco exposure more than male hormones (Dluzen, Anderson, 1997). These findings could perhaps inform policy interventions designed to protect children from nicotine exposure, even before they are born.

-Daniel Tao

References

Dluzen, D.E., Anderson, L.I. (1997). Estrogen differentially modulates nicotine-evoked dopamine release from the striatum of male and female rats. *Neuroscience Letters*, 230: 140-142.

Levin, E.D., Lawrence, S., Petro, A., Horton, K., Seidler, F.J., Slotkin, T.A. (2006). Increased nicotine self-administration following prenatal exposure in female rats. *Pharmacology, Biochemistry and Behavior*, 85:669-674.

Rydell, M., Cnattingius, S., Granath, F., Magnusson, C., Galanti, M.R. (2012). Prenatal exposure to tobacco and future nicotine dependence: Population-based cohort study. *British Journal of Psychiatry*, 200: 202-209.

What do you think? Please use the comment link below to provide feedback on this article.

[1] Maternal tobacco exposure includes either cigarette or oral tobacco consumption, or both.

[2] Heavy tobacco use is defined as five or more cigarettes or chewing tobacco dips per day.