Fetal Smoke Exposure and Risks of Wheezing During Early Childhood


Investigators from the Netherlands examined the association between maternal and paternal smoking during pregnancy and the risk of early childhood wheezing. Data were collected as part of the Generation R Study,1 a large prospective cohort study in the Netherlands. Study children were born between 2002 and 2006. Mothers reported on smoking habits of both mother and father at the time of the first routine prenatal ultrasound. Smoking habits during second and third trimesters were assessed by follow-up questionnaires. Maternal smoking habits were categorized as “never during pregnancy,” “first trimester only,” and “continued during pregnancy,” while fathers’ smoking habits were categorized as yes/no during pregnancy. Data on childhood wheezing were collected annually on study children between the ages of 1 to 4 years based on parental report. Rates of wheezing in children of parents with different prenatal smoking patterns were compared after accounting for confounding variables such as family history of asthma or atopy, gestational age, day care attendance, and postnatal smoke exposure.

Mothers of 6,969 children were enrolled in the study and data on 4,574 children analyzed. Nine percent of mothers reportedly smoked in the first trimester and 14% continued smoking during pregnancy. Compared to children of mothers who never smoked, children of mothers who continued smoking during pregnancy had a higher risk of wheezing at all ages (P < .05). These children were also at increased risk for frequent wheezing (≥4 episodes per year) during the first 3 years of life (OR=R=1.64, 1.64, 2.19). These findings were independent of the child’s postnatal smoke exposure or size for gestational age. Neither maternal smoking limited to the first trimester nor paternal smoking were associated with a significant increase in childhood wheezing.

The authors conclude that continued maternal smoking during pregnancy is associated with increased risks of wheezing in early childhood.

Commentary by
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Dr. Kier has disclosed no financial relationship relevant to this commentary. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.

The risks of environmental tobacco smoke have been well-documented in the pediatric literature.3,4 Smoking habits of parents are routinely assessed by pediatricians and counseling on smoking cessation is an important component of anticipatory guidance. But how early do we “intervene”? Prior retrospective studies have documented that adverse effects may be as early as exposure in utero.5,6

This prospective study includes data from early pregnancy. Thus, the duration and timing of smoking during pregnancy was identified. Paternal smoking was differentiated from maternal smoking with a number of confounding factors also analyzed. More importantly, postnatal smoke exposure and being small for gestational age were specifically accounted for and found to be independent of the association of fetal exposure and wheezing. Based on this study, one could speculate that there are direct adverse effects of maternal smoke exposure on the developing fetal lung. The limitation of this epidemiologic study, though, is that this remains a speculation until these adverse effects in the fetal human lung are directly identified by future laboratory studies. This study was further limited by the fact that data were based on questionnaires. In addition, smoking may have been underreported because there were no biomarkers used, and there were no direct measures of wheezing.

The take-home message of this study is that there is an opportunity for early counseling. It is never too late to quit smoking when identified during the first trimester of pregnancy. Obstetricians have been our reliable partners in preventive health; it would be worth developing joint guidelines to address this major health care concern and to jointly support tobacco-dependence programs for pregnant women.7 How early can “intervention” occur? Based on this study, well before a prenatal visit to the obstetrician.

Editors’ Note

One of the criteria for ascribing causation with a finding of an association between an exposure and an outcome is biologic plausibility. As is pointed out in the commentary above, there is no known biologic explanation for why exposure to tobacco in the second and third trimesters leads to wheezing. An alternative explanation of the major finding of this study is that smoking throughout pregnancy is merely a marker for postnatal exposure to tobacco smoke and that it is this postnatal exposure that was the exposure that led to increased childhood wheezing. Perhaps the authors failed to adequately control for postnatal exposure in their analyses and/or there was misclassification of postnatal smoke exposure (ie, data on postnatal exposure were inaccurate).

References

Key words: smoking, pregnancy, wheezing
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