Prenatal exposure to tobacco smoke raises blood pressure in infants

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Infants whose mothers smoke during pregnancy have substantially higher blood pressures in their first months of life, Dutch researchers reported in Hypertension: Journal of the American Heart Association.

A study of 456 infants in The Netherlands showed that, by age 2 months, babies born to mothers who smoked had higher systolic blood pressures compared to those whose mothers didn't smoke and weren't exposed to smoke during pregnancy. "Our findings indicate maternal smoking during pregnancy has a direct substantial impact on systolic blood pressure in early infancy and is another reason for women not to smoke during pregnancy," said Caroline C. Geerts, lead author of the study and a doctoral student at Julius Center for Health Sciences and Primary Care at the University Medical Center Utrecht in The Netherlands. "This association appears to occur in utero and doesn't appear to be due to the postnatal environment of the infant."

Infants born to mothers who smoked during pregnancy had 5.4 millimeters of mercury (mm Hg) higher systolic blood pressure levels than babies whose mothers were not exposed to tobacco smoke during pregnancy. This estimate was obtained after controlling for birth weight, infant age, gender, nutrition and age of the mother – all factors that could affect the blood pressure of the infant, researchers said.

Systolic blood pressure (SBP), the larger of the two numbers that make up a blood pressure reading, represents the blood pressure when the heart is fully contracted.

For years, women have been advised against smoking during pregnancy, which can result in intrauterine growth retardation, insufficient fetal growth that leads to low birth weight.

In the study – Wheezing Illnesses Study Leidsche Rijn (WHISTLER) – researchers assessed parents of newborns living in a residential area of Utrecht. Participating mothers were asked if they had smoked during pregnancy, did not smoke but were exposed to secondhand smoke or were not exposed to smoke during pregnancy. Infants of the participants had their blood pressure, heart rate, chest and lung function measured before 2 months of age.

Only 6.6 percent of the mothers (30 subjects) reported smoking during pregnancy; another 13.8 percent (63 subjects) reported they did not smoke, but were exposed to smoke; and 79.6 percent of mothers (363 subjects) said they were not exposed to smoke during pregnancy. The overall blood pressures of the mothers weren't significantly different among these groups.

However, researchers found an association between maternal smoking and newborn systolic blood pressure, although they didn't find significant difference between smoke exposure and newborn diastolic blood pressure and heart rate. The diastolic pressure is the lower number of a blood pressure reading and occurs when the heart relaxes. The researchers discovered male infants were more likely to have higher systolic blood pressures if their mothers smoked. Male offspring of smoking mothers had 8.6 mmHg higher systolic blood pressures than infants not exposed to tobacco smoke in utero.

"We can only speculate on the reason for this," said Geerts, adding that it has been shown that male infants react significantly different in response to pain with an increase in systolic blood pressure. "Perhaps gender is a modifier of stress responses including smoke exposure."

The researchers also found that newborns of mothers who smoked in pregnancy were significantly lighter, shorter and had a smaller chest circumference than other offspring.

Mothers who smoked in pregnancy were also less inclined to breastfeed their infants. However, the researchers said that birth weight, infant age, gender, infant nutrition or maternal age did not explain the systolic blood pressure findings.

“We aren’t sure that the increases in systolic blood pressure will continue in time,” Geerts said. “It is unknown if our findings will have an impact on blood pressure later in life.” The researchers plan to follow the children for at least four to five years to see if the increase in systolic blood pressure continues. Geerts said it’s important to study infants and children to obtain a better insight into cardiovascular disease that occurs later in life.

“There is increasing evidence that later-life ischemic cardiovascular diseases originate in early childhood,” she said. “Childhood cardiovascular risk factor profiles, including overweight, smoking and sedentary lifestyles, are increasing health problems with substantial future consequences. From a prevention point of view, it is important to determine these early life risk factors, to know at what age they exert vascular damage, and ultimately whether childhood interventions lead to actual cardiovascular risk reduction.”

Source: American Heart Association