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Nicotine In Breast Milk Disrupts Infants' Sleep Patterns *Smoking shortens nap time of breastfed babies*

PHILADELPHIA (September 4, 2007) - - A study from the Monell Chemical Senses Center reports that nicotine in the breast milk of lactating mothers who smoke cigarettes disrupts their infants' sleep patterns.

"Infants spent less time sleeping overall and woke up from naps sooner when their mothers smoked prior to breastfeeding," says lead author Julie A. Mennella, PhD, a psychobiologist at Monell.

The findings, published in the journal *Pediatrics*, raise new questions regarding whether nicotine exposure through breast milk affects infant development.

While many women quit or cut down on smoking while pregnant, they often relapse following the birth of the baby. Mennella comments, "Because nicotine is not contraindicated during lactation, mothers may believe that smoking while breastfeeding will not harm their child as long as the child is not exposed to passive smoke. However, there has been very little research on either short- or long-term effects of nicotine delivered through breast milk."

Nicotine is a pharmacological stimulant that affects the developing brain and has been shown to cause long-term behavioral and learning deficits.

In the Monell study, researchers measured the feeding behavior and sleep patterns of 15 breastfed infants over a 3-1/2 hour observation period on two separate days. The infants were between two and seven months of age. All mothers were current smokers who abstained from smoking for at least 12 hours before each observation period.

Each mother smoked one to three cigarettes immediately prior to the observation period on one day and refrained from smoking on the other. On both occasions, mothers breastfed their infants on demand over the ensuing 3-1/2 hours. Following each feed, mothers laid infants down on their backs in a crib or on the floor.

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An actigraph strapped to the infant's ankle enabled researchers to measure activity and sleep time. Levels of nicotine and cotinine, a major metabolite of nicotine, were measured in breast milk samples provided by the mothers before each feed, allowing researchers to determine the dose of nicotine passed to each infant.

Total sleep time over the 3-1/2 hours declined from an average of 84 minutes when mothers refrained from smoking to 53 minutes on the day they did smoke, a 37% reduction in infant sleep time. This was due to a shortening of the longest sleep bout, or nap, and to reductions in the amount of time spent in both active and quiet sleep.

The level of sleep disruption was directly related to the dose of nicotine infants received from their mothers' milk, consistent with a role for nicotine in causing the sleep disruptions.

Infants consumed the same amount of breast milk on both days, suggesting that they were accepting of tobacco flavor in breast milk. Previous research from Mennella's laboratory has shown that infants demonstrate increased enjoyment of flavors experienced through transmission in breast milk.

Noting that children whose mothers smoke are more likely to smoke as teenagers, Mennella speculates that early experiences with tobacco flavor during breastfeeding may increase its appeal later in life.

She comments that additional studies are needed to examine the long-term developmental effects of nicotine delivered through breast milk.

An earlier study from Mennella's lab demonstrated that breast milk nicotine levels peak 30 - 60 minutes after smoking one or two cigarettes and clear by three hours after the smoking episode. Emphasizing the many benefits of breastfeeding on infant health and development, Mennella notes that lactating mothers who smoke occasionally can time their smoking episodes to minimize nicotine exposure to their child.

The present findings highlight the need for targeted smoking cessation programs that address issues relevant to lactating women. Mennella suggests that concerns about tobacco flavor in their milk and disruptions of their infants' sleep may help motivate breastfeeding mothers to abstain from smoking.

Lauren M. Yourshaw and Lindsay K. Morgan also contributed to the study.

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The Monell Chemical Senses Center is a nonprofit basic research institute based in Philadelphia, Pennsylvania. For 39 years, Monell has been the nation's leading research center focused on understanding the senses of smell, taste and chemical irritation: how they function and affect lives from before birth through old age. Using a multidisciplinary approach, scientists collaborate in the areas of: sensation and perception, neuroscience and molecular biology, environmental and occupational health, nutrition and appetite, health and well being, and chemical ecology and communication. For more information about Monell, visit www.monell.org.

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