Study examines long-term effects of methadone treatment in pregnancy

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(Medical Xpress) -- Life gets off to a rough start for babies born to drug-dependent women, even when their mothers' addiction is clinically managed during pregnancy with methadone or other therapeutic replacement drugs. Born with their own chemical dependency, approximately 70 percent of these babies spend weeks in intensive care being treated for a cluster of unpleasant and dangerous symptoms of opiate withdrawal known collectively as Neonatal Abstinence Syndrome, or NAS.

Few studies have tracked NAS babies beyond the earliest weeks of their lives, but University of Maine doctoral student Beth Logan is pushing that body of research forward. Data from her Maine Infant Follow-Up Project show that well-managed methadone therapy itself is not associated with developmental problems in the first year of life, but that frequent dose increases during pregnancy may be linked with delayed development of motor skills, such as the ability to sit up, crawl and walk, which are important developmental milestones and predictors of cognitive development. This implies that it is essential for a woman to properly manage her methadone therapy during pregnancy to ensure she does not require frequent dose increases in order to avoid symptoms of withdrawal.

A mother's use of alcohol while in prenatal methadone treatment also appears to be linked to developmental delays, according to the study.

Working toward her Ph.D. in developmental-clinical psychology, Logan,

a native of Rhode Island, says the issue of methadone maintenance therapy during pregnancy is of particular significance in Maine, where in recent years the rate of addiction to prescription painkillers and other narcotics has skyrocketed to one of the highest in the nation. Young women make up the fastest-growing group in that population, according to statistics from the Maine Office of Substance Abuse.

Eastern Maine Medical Center in Bangor is one of two hospitals in Maine to have developed recognized expertise in meeting the needs of infants who develop NAS. Clinicians at EMMC and Maine Medical Center in Portland are at the national forefront of managing these babies, and their success in this emerging specialty is guiding the way for doctors and hospitals in other states.

“It is an enormous social responsibility to be working on such an important problem,” Logan says of her research team, which includes principal investigators UMaine psychology professor Marie Hayes and Dr. Mark Brown, chief of pediatrics and director of nurseries at EMMC.

With the help of three outpatient methadone clinics in Bangor, Logan and her research colleagues have enrolled 110 mother-baby dyads in the longitudinal study, which began in 2006. A comparison group of about 30 mother-baby dyads has similar demographics, but the mothers in the control group are not opiate abusers and have not enrolled in methadone treatment during their pregnancies.

Controlling for other variables in the study is no simple matter, Logan notes, as opiate dependent mothers-to-be typically present a “perfect storm” of risk factors that can affect the healthy development of their babies, before and after birth. Most of the mothers in the methadone group are low-income, have a low educational attainment, and are unemployed. Many are victims of domestic violence and suffer from psychiatric diagnoses such as depression and anxiety. Most are not

married to their baby's father. In addition to these stress-inducing factors, maternal lifestyles often include the abuse of alcohol, tobacco and drugs, poor nutrition, inadequate pre-natal care, frequent changes in housing and a lack of family and community support.

"There are a lot of factors affecting how well these children develop," Logan says, but the study is designed to isolate methadone use during pregnancy and to measure its effect on early development.

The Maine Infant Follow Up Project begins with a maternal interview during the third trimester of pregnancy, focusing on the mother's use of alcohol, tobacco and illicit drugs during pregnancy. After birth, infants' activity levels are monitored to determine physiological irritability, sleep patterns and arousability in addition to standard neonatal assessments.

Assessments at one month and seven months include "event-related potential" testing, or ERP, which measures brain activity in response to novel sounds and is designed to assess cognition and attention. At nine months and one year, motor development, emerging language skills, cognition and social-emotional development are assessed.

"The place we're seeing the biggest delays is in motor development," Logan says.

While most babies in the control group are standing, cruising and preparing to take their first steps at nine months, nearly 40 percent of babies in the methadone group are still having trouble crawling and sitting.

These delays are most pronounced in babies born to women whose methadone dosage was increased frequently, suggesting that the mother's withdrawal during pregnancy maybe linked to the delays. Frequent maternal use of alcohol, especially binge drinking, also increased the

incidence of developmental delay in the methadone group, Logan notes.

Additionally,EEG studies have revealed that infants exposed prenatally to a combination of opiates and alcohol are less able to become accustomed to repeated stimuli, a finding that predicts developmental delays in the school setting.

Logan has been invited to give an oral presentation of these findings at an upcoming meeting of the Pediatric Academic Society in Boston.

She says the next step is to extend the study to follow the NAS babies through toddlerhood, assessing them at 18, 24 and 36 months of age.

“We will continue to assess their motor development, and see if their delays persist over time or if they catch up. We also will monitor for the emergence of delays in other areas,” she says. Researchers will assess toddler sleep habits, their play interactions and the home environment in addition to measuring their cognitive, motor and language development with standardized tests.

In addition, Logan and the research group are collaborating with scientists at Tufts Medical School to identify genetic factors shown to predispose some people to developing opiate dependency, regulate opiate processing in the body, and affect the severity of NAS in newborns. Future work in this area may improve medical treatment for NAS and protect infants’ developing brains.

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