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First and Only Study on Harmful Effects of Infants Prenatally Exposed to Ecstasy

INTERNATIONAL CASE WESTERN RESERVE-LED STUDY PUBLISHED IN NEUROTOXICOLOGY AND TERATOLOGY

February 28, 2012

CLEVELAND - A study led by Case Western Reserve University School of Medicine, in collaboration with the University of East London UK, and Swansea University UK, is the first to show the effects of the drug ecstasy on fetal and infant development.

Ecstasy is a stimulant and hallucinogen, and is one of the most widely used illegal drugs among young people, with a range of damaging effects. It is known scientifically as 3,4-methylenedioxymethamphetamine or MDMA. This international prospective study, published in the Feb. 28 issue of *Neurotoxicology and Teratology*, shows that use of ecstasy among pregnant women affects the chemical signaling that determines a baby's gender, and, contributes to developmental delays among infants.

"The potential harmful effects of ecstasy exposure on prenatal and infant development have long been a concern," said Lynn T. Singer, PhD, the study's principal investigator, professor of environmental health sciences, pediatrics and psychiatry at Case Western Reserve University School of Medicine, and, deputy provost and vice president for academic affairs at the university. "The drug's negative effects are particularly risky for pregnant women, who may use the drug without being aware of their condition," she adds.

The study's 96 participants were recruited from The University of East London (UEL) Drugs and Infancy Study (DAISY), which focused on recreational drug use among pregnant women. Prior to and during pregnancy, the women were interviewed about their substance abuse, including their use of ecstasy. They were also evaluated for psychiatric symptoms and related difficulties that stemmed from their drug use.

Researchers compared infants exposed to ecstasy to non-exposed infants, at birth and at fourth months of age. They examined the babies' growth and noted any potential delays in

cognitive development and attainment of milestones in coordinated movements and gross motor development.

Most of the women surveyed had taken a variety of illegal drugs prior to, and, during pregnancy. Differences among the women were analyzed to control for confounding variables. Researchers found that women who reported using ecstasy while pregnant suffered more negative social consequences as a result of their ecstasy use, than non-users. These included more job, health and social problems.

The use of ecstasy during pregnancy also appeared to affect the ratio of male to female babies born. Researchers noted a preponderance of male births among women who used ecstasy while pregnant, whereas typically the sex ratio at birth is half and half.

“The research findings also suggests there are some neurochemical effects of the drug that seem to affect the motor functioning of infants,” says Derek Moore, PhD, professor of psychology at The University of East London, director of the school’s Institute for Research in Child Development (IRCD), and co-principal investigator on this research. He coordinated the research in the UK.

At four months, ecstasy-exposed infants in the study demonstrated poorer quality of coordinated movement and lower milestone attainment, according to Dr. Moore. For example, some ecstasy-exposed infants balanced their heads at a later age than babies that were not exposed to the drug. Others showed delays in eye hand coordination, turning from back to side and being able to sit with support, which could heighten the potential for additional developmental delays later on.

The research underscores a potential link between the amounts of ecstasy exposure to poorer motor quality, which warrants further study, Dr. Singer says.

Ecstasy is such a widely used drug throughout the world, that if prenatal exposure is shown to be harmful, many infants could be affected, the researchers say.

“The psychomotor and related psychological problems identified in these four-month old babies are very worrying, but perhaps not particularly surprising,” says Andy Parrott, BSc, PhD, professor of psychology at Swansea University in Wales, and, the other co-principal investigator on this research. “Ecstasy can deplete the level of serotonin, which is important neurotransmitter for many brain functions, including gross motor control.”

Serotonin carries nerve impulses between cells, which regulate mood states, sleep and anxiety. Early in fetal development, serotonin plays a vital role in brain formation. If the level and behavior of serotonin is altered, it can have long-term effects on learning and memory, basic research models have shown.

The new research grew out of Dr. Singer's ongoing research into high-risk infants and the effects that drugs have on fetal and infant development. She became familiar with the work of Dr. Parrott at Swansea and Dr. Moore and John Turner, PhD, principal lecturer in the School of Psychology at the University of East London, and initiated this important prospective study to investigate the prospective effects of ecstasy on subsequent child development.

The study was funded by the National Institute on Drug Abuse, part of the National Institutes of Health. It is funded to collect data up to 18 months after an infant's birth. Researchers are examining the same women and children 12 months after birth to assess if the slight delays noted early on worsen or persist, potentially signaling the long-term negative effect of prenatal ecstasy exposure.

The researchers hope to obtain additional funding to continue the study well into the infants' childhood years. The fear that, in the future, the infants exposed to ecstasy while prior to birth may experience long-term deficits that will negatively affect their memory, learning capacity, and emotional development.

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