Post-term children have higher behavioural and emotional problems in early childhood

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We already know there are long-term health problems associated with pre-term birth, but what about babies born post-term? New research published in the *International Journal of Epidemiology* has found that post-term birth, defined as a birth after a pregnancy of 42 weeks, is associated with more behavioural and emotional problems in early childhood, especially Attention Deficit/Hyperactivity Disorder (ADHD) problems.

Lead author Hanan El Marroun, of the study entitled 'Post-term birth and the risk of behavioural and emotional problems in early childhood', comments that "post-term children have a considerably higher risk of clinically relevant problem behaviour and are more than twice as likely as term born children to have clinical ADHD. Further research is needed in order to determine the causes of post-term birth and to minimize the long-term consequences. It is also important that further research is carried out in order to demonstrate a causal relation between post-term birth and behavioural problems and longer follow ups would also be advantageous."

The research found a U-shaped association between gestational age at birth and behavioural and emotional problems in early childhood. This indicates that both preterm and post-term children are at higher risk for problems. Post-term children were almost twice as likely as term born children to have behavioural and emotional problems and were more likely to show problems in the clinical range on the ADHD scale. A linear regression analysis also showed a curvilinear relation between

gestational age and behavioural problems for the continuous scores on the total problems, ADHD, affective problems scale and pervasive developmental problems, which suggests that children with a shorter or longer gestation have a higher behavioural problem score compared to children born at term.

The study was embedded in the Generation R Study, a large population-based prospective cohort study from foetal life onwards. Pregnant mothers who were residents of Rotterdam and due to give birth between April 2002 and January 2006 were asked to participate by their midwives and gynaecologists. The researchers measured gestational age using ultrasound, a method thought to be superior to date of last period. Based on this measure, out of a total of 5145 babies, 382 (7%) were born post-term and 226 (4%) were born pre-term. A standardized and validated behavioural checklist (Child Behaviour Checklist, CBCL/1.5-5) was used to assess the children. At both 18 and 36 months old a postal questionnaire was sent to the mother of the child and the father was also sent a questionnaire when the child was aged 36 months. Both post-term and pre-term babies were at higher risk of behavioural and emotional problems at 18 and 36 months.

Supplementary analysis found similar results when children whose gestational age was measured in the second or third trimester were excluded and the results did not appear to be explained by factors such as mother's weight and height, ethnicity, family income, alcohol consumption, smoking, education level or maternal psychopathology in mid-pregnancy. However, the authors point out that although they controlled for a large number of covariates, other factors, for example maternal malnutrition during pregnancy, cannot be ruled out.

The authors propose several potential explanations for their findings. First they discuss the higher risk of perinatal problems known to be associated with larger babies. However, excluding babies that weighed

over 4000 grams at birth and babies that were induced did not alter their findings. Second they discuss uteroplacental insufficiency; the situation in which an "old" placenta offers fewer nutrients and less oxygen than required by a full term foetus. This lack of nutrients and oxygen may predispose to abnormal foetal development which, in turn, may lead to abnormal emotional and behavioural development. However, the observational nature of the present study did not enable the authors to distinguish possible effects of uteroplacental insufficiency from perinatal problems. Third they discuss potential disturbance of the "placental clock" which controls the length of pregnancy and regulates the maternal and foetal hypothalamic-pituitary-adrenal axis (HPA-axis). It has been suggested that placental endocrine malfunctioning or maternal stress at critical times during foetal development may influence the foetal HPA-axis, leading to neuroendocrine abnormalities that could increase the child's vulnerability to emotional and behavioural problems later in life. Finally, they suggest that the same cause may underlie being born post-term and having behavioural problems, for example, neurodevelopmental factors related to behavioural problems could be involved in the complex process of birth.

The authors caution that longer follow-up is necessary to establish whether the relationship between post-term birth and behavioural problems persist beyond 36 months. However, they also advise that practitioners involved in the management of prolonged pregnancy should take note of their findings.

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