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Weight patterns in infancy and Mental Disorders in Childhood

- an epidemiological study in the Copenhagen Child Cohort 2000

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Background

Low birth weight is associated with cognitive and behavioural problems in children (especially attention deficits and learning difficulties) (Aarnoudse-Moens et al 2009), and schizophrenia in adults (Abel 2010); giving rise to theories of fetal programming. Also, a linear dose-response association has been shown between birth weight and any hospital diagnosed mental disorder in adults, indicating a more dynamic association with fetal growth and not only low birth weight per se (Abel 2010).

Although, such effects of fetal growth retardation may extend into postnatal growth, little is known about the associations between early postnatal weight faltering and mental disorders (Martin 2016).

However, weight faltering is considered an important indicator of physical and psychosocial problems associated with feeding problems and undernutrition in early childhood; associated with long-term growth delay and cognitive deficits (Cole et Lanham 2011, Galler 2011). Most studies on the effect of weight faltering however, have been conducted in developing countries with high rates of malnutrition and severe undernutrition, and the results cannot readily be extrapolated to affluent western societies.

Still, it is a consistent finding in population studies from more affluent societies that weight faltering without obvious somatic explanation is associated with early feeding problems (Olsen 2007), including compromised appetite and subtle signs of early dysregulation (Emond 2007, Hvelplund 2016, Wilensky 1996), and early neurodevelopmental problems and later cognitive deficits (Reilly 1999, Drewett 2006). However, little systematic research is available on weight faltering and other aspects of development, including child-psychiatric problems; with case reports and clinical studies describing early weight faltering in children with autism spectrum disorders (Keen 2008), and disturbed attachment (Coolbear 1999). On the other hand, there is commencing evidence that high weight gain in early infancy might be associated with later obesity, known to be associated with poor mental health (Elks 2010).

Thus, although there is solid evidence that intrauterine growth retardation is a risk indicator of mental illness, little is in reality known about the effects or associations of postnatal growth concerning mental illness. Thus, since both overweight and weight faltering are preventable, it is highly relevant to investigate the possible associations between early growth patterns and later mental illness.

The Aim of this study is to investigate the associations between patterns of weight gain in infancy and psychiatric disorders in childhood between 0-12 years of age.

Hypotheses

It is hypothesized that weight faltering in infancy will be associated with child psychiatric disorders in later childhood such as neurodevelopmental disorders (ADHD, Autism Spectrum disorders), parent-child relationship disorders, and disordered eating, with differences according to age of onset; while high weight gain is hypothesized to be associated with overweight and problematic eating.

Materials & Methods

The current study is a follow-up of a previous PhD-thesis 'Failure to Thrive in 0-1-year-old Children – definition and predictors' (Olsen 2005), based on data from the prospective birth cohort 'Copenhagen County Child Cohort 2000' (CCCC2000), constituting 6090 children from the general population born in the year 2000. The overall focus of the CCC2000 is to broadly investigate developmental phenotypes and early indicators of psychopathology prospectively from birth (Skovgaard 2005). The cohort has so far been assessed at three developmentally important age periods: infancy: 0-1 years (Skovgaard 2005), preschool-age: 5-7 years (Micali 2011), and preadolescence: 11-12 years (Elberling 2014).

Previous research from the cohort has shown clear associations between weight faltering and contemporary feeding problems in infancy regardless of the age of onset; and indicates that especially children with onset of weight faltering in late infancy with 'de novo' eating problems could constitute a specific risk group of later child psychiatric disorders (Olsen 2010). Also, weight faltering in general has been found to be associated with problematic eating patterns when the cohort was assessed in preschool age (Micali 2011).

All data for the current study are available and ready to analyse.

Measures of exposures and outcomes

Data from infancy originates from standardized public health nurse records, including anthropometrical measurements, assessment of physical and mental development, parent-child relationship, and information on feeding and sleeping patterns with additional information from the Danish National Birth Registry and the Danish National Registry of Patients regarding birth weight and perinatal data.

The Thriving Index (TI), *summarizing if weight gain is appropriate when considering birth weight (taking into account the normal phenomena of regression towards the mean)* (Olsen 2007) will be used to investigate weight gain patterns in infancy as the exposures; while data from the National Patient Registry and the Central Psychiatric Registry will be used to identify Psychiatric outcome defined as diagnosed psychiatric illness within the first twelve years of life.

The Patient Registry will furthermore be used to obtain information about somatic illnesses in infancy.

Statistics

Analyses of associations will be done with each growth pattern of interest separately using regression analyses. Adjusted analyses will include variables likely to be confounders of an association between early growth and child psychiatric disease, such as gender, birth weight, gestational age, maternal smoking during pregnancy, congenital disorders, and parental psychopathology at time of birth. A p-value of 0.05 will be considered of statistical significance. Positive predictive values will be calculated based on the univariate analyses as the predictive power are independent on the causal associations.

Ethics

The CCC2000 study covering age 0-12 years is approved by the Danish Data Protection Agency (J.nr.2010-41-4438) and The Scientific Ethics Committee of Copenhagen (KA-05103).

Perspectives

The CCC2000 cohort is both nationally and internationally unique combining systematic registration of the developmental assessments in infancy embedded in the general health surveillance programme (ensuring data from infancy on 92% of the cohort) with prospective follow-ups including broad assessments of psychopathology and developmental phenotypes in childhood. Using an existing surveillance programme also implies the possibility for easy testing and implementation of results for prevention.

Time schedule

One week: Analyses of data

Two-three weeks: Writing the first drafts of a scientific paper for an international scientific journal

Economy

Three-four week's salary for the Primary Investigator = 55.000, - Dkr.

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