

## **Fetal and early life growth and body mass index from birth to early adulthood in a 1958 British cohort**

Parsons TJ, Power C. Manor O.

BMJ 2001;323:1331-1335.

**Reviewed by Dr. Peter Garner of Ottawa, Canada**

### OBJECTIVE

The objective of the trial was to determine the influence of birth weight on body mass index at different stages of later life, and whether this relation persists after accounting for potential confounding factors; and the role of indicated fetal growth (birth weight relative to parental size) and childhood growth.

### DESIGN

The study and design was a longitudinal study as the 21958 British birth cohort population, and the setting was in England, Scotland and Wales. The participants in the trial were all singleton births born between the 3<sup>rd</sup> and 9<sup>th</sup> of March 1958, which was 10,683 participants with data available at age 33 years.

Main outcome measures were body mass index at ages, 7, 11, 16, 23 and 33 years

### RESULTS

The relation between birth weight and body mass index was positive and weak, becoming more J-shaped with increasing age. When adjustments were made for maternal weight, there was no relation between birth weight and body mass index at age 33. Indicators of poor fetal growth based on mother's body size were not predictive, but the risk of adult obesity was higher among participants who had grown to a greater proportion of their eventual adult height by age 7. In men only, the effect of childhood growth was strongest in those with lower birth weights and to a lesser extent those born to lighter mothers.

The conclusion from this study was that maternal weight (or body mass index) largely explains the association between birth weight and adult body mass index, and it may be a more important risk factor for obesity in the child than birth weight. Birth weight and maternal weight seem to modify the effect of childhood linear growth on adult obesity in men. In generational associations between the mothers and her offspring's body mass index seem to undergo the well documented association between birth weight and body mass index. However, other measures of fetal growth are needed for a fuller understanding of the role of the intrauterine environment and the development of obesity.

### COMMENTARY

Birth weight has been shown previously to be positive related to subsequent obesity. However, few studies have investigated whether this relation is confounded by other factors such as parental size. Birth weight may be an inadequate indicator of the intra-uterine environment.

Intrauterine life is a critical period for the development of obesity later in life. Growth in utero is summarized rather crudely, by birth weight, which if related to fatness later in life might implicate the fetal environment in the development of obesity. This study shows that the relation between birth weight and adult body mass index is largely accounted for by mother's weight. It also showed that fetal growth index by birth weight relative to parental body size was unrelated to adult obesity. It also showed that rapid linear growth in childhood increased the risk of obesity in adulthood, especially in males with low birth weight. Finally, among boys who grew rapidly, the risk of obesity in adulthood was similar for both lower and higher birth weight.

No explanation has been shown as to why birth weight and childhood growth are related to the development of adult obesity in men, whereas the pattern in women is less distinct. Maternal weight seems to account for the relation between birth weight and body mass index in both men and women and the rate of maturation is related to adiposity in both sexes. Therefore, several hypotheses for why compensatory growth might be associated with adverse health outcomes in later life. Some of these are derived from animal studies and so far they remain speculative, and the mechanisms involved in humans is undefined.