A survival analysis approach to assess the association between maternal pre-pregnancy overweight and childhood overweight – Results of the Ulm Birth Cohort Study (UBCS)*

S. Brandt[1**], A. Moß[1], H. Brenner[2], D. Rothenbacher[3], M. Wabitsch[1]

[1] Division of Pediatric Endocrinology and Diabetes, Interdisciplinary Obesity Unit, Department of Pediatrics and Adolescent Medicine, University Medical Center Ulm, University of Ulm, Germany
[2] Division of Epidemiology and Aging Research, Cancer Research Centre (DKFZ), University of Heidelberg, Germany
[3] Institute of Epidemiology and Medical Biometry, Ulm University, Germany

Conclusion

These results suggest that maternal prepregnancy overweight is a significant factor in the association between fetal environment and post-delivery development of overweight in their offsprings. These findings may be explained by genetic imprinting and/ or intrauterine programming of offsprings endocrine and metabolic system by the mother.

Introduction

It is believed that the fetal and early postnatal environment has a significant impact on the development of overweight of a child in later life (early life programming of long-life diseases). Maternal pre-pregnancy BMI values determine the fetal environment.

Aim

It has been suggested that maternal prepregnancy overweight increases the risk of an child of becoming overweight in childhood. We aimed to use a survival analysis approach to investigate this hypothesis in the prospective Ulm Birth Cohort Study (UBCS).

Methods

Ulm Birth Cohort Study (UBCS)

1. Recruitment of the study participants

- Recruiting period: November 2000 - November 2001
- Place: Gynaecology and Obstetrics Unit, University of Ulm, Germany
- Inclusion criteria: children with a birth weight ≥2000g, pregnancy duration of at least 32 weeks (n= 1.086 mothers and their newborns)

2. Study design

- Baseline examination:
  - Maternal prepregnancy BMI values have been obtained from maternal record of prenatal care [normal weight: BMI<24.9 kg/m²; overweight: BMI≥25 kg/m²]
  - Parent questionnaire at baseline: maternal age at child's birth [years], maternal smoking habits during pregnancy [no vs yes] , maternal school education [school years] , maternal migration background [yes vs no], maternal intention to breastfed the child [yes vs no], number of parity, gender of the child [male vs. female], week of gestation [weeks]
- Follow-up examinations (birth up to age of 6-years): weight and height values of the children were obtained at each follow-up examination (parent questionnaire, measured by paediatricians at German regular health examinations "U-Untersuchung")
- Definition of overweight at each follow-up examination:≥90th age- and sex- specific percentiles of the German reference data [Kromeyer-Hauschild et al., 2001]

3. Statistics

- Study sample: children and mothers with complete baseline covariates [n=1.026]
- Survival analysis: Kaplan-Meier method

Kromeyer-Hauschild K, Wabitsch M, Kunze D et al. (2001): Percentiles of body mass index in children and adoelscents evaluated from different regional German studies. Monatsschr Kinderheilkd 149: 807-818

Results

Figure 1. Comparison of the survival functions of children of pre-prenancy normal weight mothers (continous line) and of children of pre-pregnancy overweight mothers (dotted line)

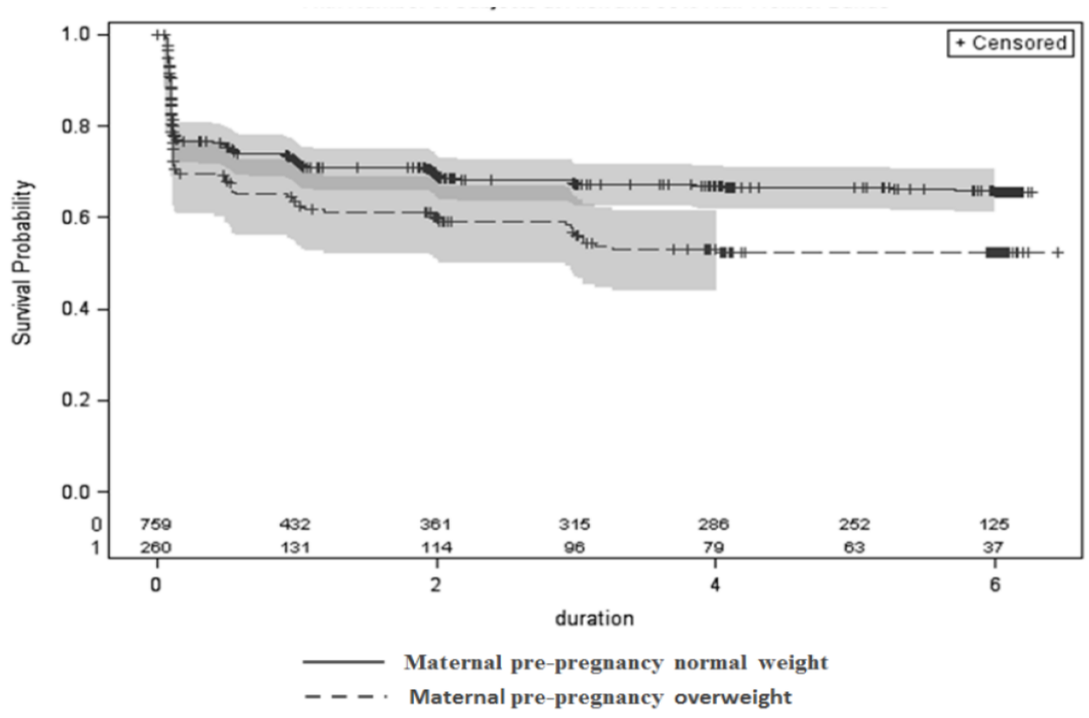

Table 1. Crude and adjusted Cox proportional hazard regression model

	HR	95% CI	p-value	HR	95% CI	p-value
	crude			**adjusted***		
Maternal pre-pregnancy normal weight [Ref]	1.00	-		1.00	-	
Maternal pre-pregnancy overweight	**1.46**	**(1.22-1.68)**	**0.0015**	**1.33**	**(1.08-1.56)**	**0.0213**

* adjusted for: maternal age at child's birth [years], maternal smoking habits during pregnancy [no vs yes] , maternal SES [low vs middle vs high] , maternal migration background [yes vs no], maternal intention to breastfed the child [yes vs no], number of parity, gender of the child [male vs female], week of gestation [weeks]

- **32.2% of the children became overweight** within study period (0 to 6 years)
- **Offsprings of pre-pregnancy overweight mothers had a 46% higher risk** of becoming overweight in childhood than offsprings of pre-pregnancy normal weight mothers [HR: 1.46 (1.22-1.68)]
- After **adjusting for covariates**, this association remained **still significant** [HR: 1.33 (1.08-1.56)]

Contact

Dr. biol. hum. Stephanie Brandt **
Division of Pediatric Endocrinology Diabetes
Department of Pediatrics and Adolescent Medicine, University of Ulm
E-Mail: Stephanie.Brandt@uniklinik-ulm.de

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