INTRODUCTION

Pregnancy with a male fetus may cause a maternal immune response against male-specific minor histocompatibility Y-H antigens, and thus have negative effect on the subsequent pregnancies, due to presence of these antigens for several years after birth [1-4]. Therefore, boys having an older brother might have a smaller size at birth than boys born after a sister.

We test the relationship between sex of the previous sibling and size at birth (birth weight, birth length and ponderal index) of subsequent child in Polish, rural population.

METHODS

The study participants were 853 boys (mean age 17.4, SD 12.98, who weighted at least 2500 g at birth) from the area of The Mogielica Human Ecology Study Site located in a Polish village with high birth rate.

Data were collected between years 2003 – 2011 by personal questionnaires and information about size at birth was obtain from personal health records or collected by the interview. Year of children’s birth was included to control for a cohort confounding effect. Mothers who smoked during pregnancy were excluded from the analysis.

RESULTS

Boys who were born after a brother were lighter (F_{1,621}=3.72, P=0.005) and shorter at birth (F_{1,496}=5.02, P=0.02), when controlled for year of children’s birth. We observed no statistically significant difference in ponderal index between boys born after a brother or after a sister.

CONCLUSIONS

These results confirm an evolutionary hypothesis which suggests that prenatal immunological environment created after a male-pregnancy affects birth weight and birth length of laterborn boys [3]. According to Blanchard & Bogaert [8] male-specific H-Y antigens (located only on a male cell surfaces) may enter mother’s circulation system and start an immune-response against another male-fetus, and result in decrease of its’ size at birth.

From the evolutionary point of view, it should be tested if mother’s fitness reduced due to laterborn’s lower birth size is compensated by older brothers, seeing that children with smaller size at birth have higher risk of childhood mortality.

Moreover, the literature suggests that the smaller size at birth might be associated with a higher risk of obesity [6], type 2 diabetes [7], and osteoporosis [5]. Additionally, smaller size at birth is also related with greater deposition of fat in the abdominal area, which is considered as a risk factor for cardiovascular diseases [6]. Smaller birth dimensions may be also associated with abnormalities in insulin secretion and glucose tolerance disorders [7], also in blood vessels functioning disorders [6] and in decreasing bone mineral density [5]. Birth order could be a valuable marker of biological condition useful for public health studies, especially because of possible long-life negative consequences of low birth size.

Literature cited: