

# Weight gain between first and second pregnancies associated with increased odds of male second child

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A slightly greater number of males than females are born worldwide every year. In recent decades, although there are still more baby boys born than girls, there has been an apparent decline in the ratio of male to female newborns in several industrialized countries, including Canada, Denmark, England, Germany, Japan and the United States. That has led researchers to ask: Are there any factors that can influence the probability of giving birth to a baby boy or girl?

A new study from the Harvard School of Public Health (HSPH) and Karolinska Institutet in Stockholm, Sweden, found that mothers who experienced an increase in weight from the beginning of the first pregnancy to the beginning of the second pregnancy may be slightly more likely to give birth to a baby boy during their second pregnancy. The study appears online September 24, 2007 in the journal *Fertility & Sterility*.

“The results are provocative because few biological factors are known in humans to influence the chances of either conceiving or carrying to term a baby boy or girl. Our study suggests that maternal nutritional factors might play a role,” said Eduardo Villamor, assistant professor of international nutrition at HSPH and lead author of the study.

Some prior studies had looked at what factors might influence the sex ratio, but evidence of causality has been weak. Parental smoking, for

example, has been associated with both lower and higher sex ratios. Maternal nutritional status had been studied, but there was little evidence to support a causal relationship with the sex ratio. One of the hypotheses that the authors of this study wanted to test was whether the increase in maternal obesity in several industrialized countries could play a role in the declining sex ratio. Their study found the opposite--maternal weight gain seemed to favor the birth of boys.

The study population, drawn from the Swedish Birth Registry, included 220,889 women who had successive pregnancies between 1992 and 2004 (live births and stillbirths were included). The researchers analyzed the change in women's body mass index (BMI) between the first and second pregnancies. (BMI is weight in kilograms divided by the square of height in meters.) The male to female sex ratio of the second pregnancy increased linearly with the amount of weight change from the first to second pregnancy, from 1.024 in women who lost more than 1 unit BMI to 1.080 in women who gained 3 or more units (a male to female sex ratio of 1.000 would indicate an equal number of boys and girls being born). The trend was independent of obstetric complications, maternal smoking, parental age, length of the interpregnancy interval and the sex or survival status of the first-born child.

The data suggest that interpregnancy weight gain appears related to a slight increase in the probability of giving birth to a baby boy during a second pregnancy. The obesity epidemic does not appear to explain the observed decline in the sex ratio in some industrialized countries, which indicates that there are factors still unknown influencing the probability of giving birth to boys or girls.

The authors are careful to note that women should not gain weight to try to influence the sex of their baby. "Weight gain before pregnancy carries significant risks to the mother and the baby, and should not be practiced to influence the odds of having a boy," said Villamor. "Other factors of

which weight gain is only an indicator could be at play here.”

Source: Harvard School of Public Health

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