

EDITORIAL

How do we counsel women with gestational diabetes about weight gain?

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Women with diabetes in pregnancy are at increased risk for maternal and neonatal complications. Luckily, many of these complications are relatively short term, such as preeclampsia and fetal hypoglycemia. However, others may potentially lead to long-term complications such as fetal macrosomia. Fetal macrosomia can increase the risk for a cesarean delivery,¹ which, given the current vaginal birth after cesarean rates of less than 10%, commits the mother to subsequent cesarean deliveries in future births in more than 90% of cases. Fetal macrosomia can also lead to higher rates of shoulder dystocia should a vaginal delivery occur.² Long-term, fetal macrosomia can lead to higher rates of childhood and adolescent obesity in the offspring, which, in turn, is associated with type 2 diabetes.³ Although type 2 diabetes has a genetic component, it also has, in some sense, a Lamarckian heritability via the intrauterine environment that the fetus is exposed to which leads to the fetal macrosomia. You might remember that Jean-Baptiste Lamarck had proposed the idea of inheritance of acquired traits in 1802. This was debunked by modern genetics, but now with developmental origins of health and disease, also known as the Barker hypothesis, some of these concepts are similar to Lamarck's ideas.

This intrauterine environment, which leads to fetal macrosomia, is likely affected in many ways; two in particular are the total calories and the glucose levels that are transplacentally passed to the fetus. The primary dietary focus in a diabetic pregnancy is on the glucose control. It has been demonstrated that with better glucose control, the rate of macrosomia is decreased.⁴ However, overall weight gain may have an effect as well. Certainly in non-diabetic pregnancies, weight gain is associated with fetal macrosomia.⁵ Recently, in 2009, the Institute of Medicine revised their weight gain guidelines in pregnancy based on pre-pregnancy body mass index. However, these guidelines are not modified based on pre-gestational or gestational diabetes.

In the paper by Ouzounian *et al.*⁶ in the current edition of the *Journal of Perinatology*, the authors examine weight gain in women with gestational diabetes. The authors demonstrate that regardless of pre-pregnancy body mass index, if a woman with GDM gains above the Institute of Medicine (IOM) recommendations, the risk of fetal macrosomia is increased threefold. Further, they demonstrate an increased risk of both shoulder dystocia and cesarean delivery. These findings parallel

those by Cheng *et al.*,⁷ who demonstrated a twofold increased risk of fetal macrosomia when comparing those who gained above the IOM recommendations as compared with those who gained within the IOM guidelines.

On the basis of these studies, certainly women with GDM should be advised to not gain more than the IOM guideline recommendations for all pregnant women. However, the question remains, should they be gaining less? In the study by Cheng *et al.*, they found that women who gained less than the IOM recommendations had a 40% lower risk of fetal macrosomia. However, they also had a 40% increased risk of birth weight less than the 10th centile. Thus, there is likely some tradeoff between gaining too much and gaining too little, as it affects fetal growth, which may have downstream effects via fetal programming.

The other important issue to bring to the fore is that most of the studies of gestational weight gain are not randomized. Thus, confounding factors that may be associated with gaining weight may be the real culprits as opposed to the weight gain itself. Therefore, the next steps in determining the optimal amount of weight gain in both diabetics and non-diabetic pregnancies need to use the gold standard approach to clinical research to determine both what is the optimal amount of weight gain and whether the amount of weight gain can be affected by an intervention. However, until that time, we still need larger cohort studies to examine tighter weight gain thresholds in diabetic pregnancies to determine the optimal level of weight gain.

Meanwhile, we can be reasonably assured that advising women with gestational diabetes that they should not gain more than the IOM guidelines is a step in the right direction. But, what is the best way to frame this guidance? Here Lamarckian inheritability, the Barker hypothesis, developmental origins of health and disease, or fetal programming, any or all of these descriptors will do, can be used to contextualize the issue. A pregnant woman can be told about how treating her gestational diabetes might help stave off her risk of type 2 diabetes, and it will have an effect only in a minority of women. However, when they are told about how the benefits will affect their fetus, compliance goes way up. So, advising such women to keep their weight gain controlled because it will lead to less fetal macrosomia and, in turn, less downstream obesity and type 2 diabetes in their offspring seems like a great way to motivate pregnant women to make the behavioral changes.

Conflict of interest

The author declares no conflict of interest.

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