

GLYCEMIC INDEX AND PREGNANCY

making healthy choices easy



Pregnancy is a time when carbohydrates and the Glycemic Index (GI) are of special relevance.

A mother's blood glucose levels during pregnancy are directly correlated with a baby's growth rate in utero. Blood glucose levels that are too high or too low can therefore affect growth, and may result in a baby who is born small or large for gestational age. It is well accepted that both small and large babies have an increased risk of childhood obesity, as well as higher risk of metabolic diseases such as diabetes and hypertension in adulthood.

Therefore, optimising the glucose environment in utero may reduce a child's risk of metabolic problems later in life. It is well known that efforts to reduce blood glucose levels in mothers with diabetes, including dietary strategies, will curb excessive growth and reduce the likelihood of having a complicated delivery.

There is now research to suggest that managing blood glucose levels in women who don't have diabetes can also improve pregnancy outcomes.

One large observational study of 23,000 pregnant women from 9 countries who underwent an oral glucose tolerance test (OGTT) in pregnancy found that those with higher blood glucose levels (either fasting, or at 1 hour or 2 hours after the glucose drink) were more likely to have an infant born above the 90th percentile for birth weight, and an adverse pregnancy outcome (e.g. an emergency caesarean delivery)¹.

Other studies show that even in women without diabetes, blood glucose levels influence their offspring's growth after birth. Among a group of 263 healthy pregnant American women, researchers found that their average blood glucose level at the end of the second trimester directly predicted their child's body mass index at 3 years of age².

Infant birth weights and childhood obesity have increased hand in hand over recent decades in most industrialised nations. We now know that life in utero is a critical period for the metabolic 'programming' of obesity in later life. A mother's weight at the time of conception and weight gain from early to late pregnancy profoundly influences infant birth weight.

The increasing GI of the modern diet might also be a factor.

The importance of weight

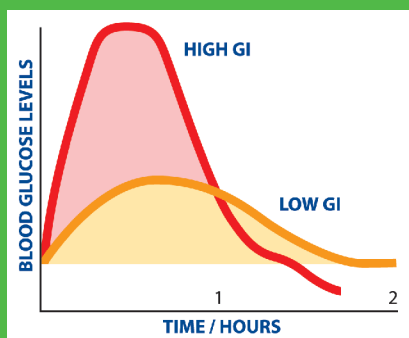
With more than 50% of Australian women and 60% of men now over-weight or obese, the impact of excess weight on fertility and pregnancy is a growing concern.

Not only can being overweight affect fertility but several studies have found that children of overweight parents are more likely to be overweight themselves, even after adjusting for other lifestyle and socioeconomic factors.



Babies born to mothers who are obese have also been found to have higher levels of body fat and a greater degree of insulin resistance, even as newborns³, putting them at higher risk of developing metabolic problems such as obesity and type 2 diabetes later in life.

GLYCEMIC INDEX



The **Glycemic Index (GI)** is a relative ranking of carbohydrate in foods according to how they affect blood glucose levels. Foods with a low GI ($GI \leq 55$) release glucose into the bloodstream at a slow sustainable rate, and have proven benefits for health.

A low GI diet is not a fad diet but a way of eating that is sustainable in the long term and is backed by over 30 years of scientific evidence. This includes facilitating the management of diabetes, weight loss and weight loss maintenance and reducing the risk of developing type 2 diabetes, diabetes complications and other chronic lifestyle diseases.

To make healthy choices easier we developed the **GI Symbol Program**, a not-for-profit health initiative backed by the University of Sydney and Diabetes NSW & ACT.

The GI Symbol is a powerful tool for quickly and reliably making healthy food choices when grocery shopping. It's your guarantee that the GI value stated near the nutrition information label is accurate and that the food meets strict nutritional criteria.

A free monthly GI Newsletter informs you of the most recent findings from around the world (Register at www.gisymbol.com)

GI and weight control

There is very good evidence that low GI diets assist with weight loss⁴ and weight maintenance⁵ and thus help with weight control in pregnant women. Low GI diets have been shown to reduce weight gain compared with high GI diets, despite similar energy and macronutrient contents⁶.

The ROLO study⁷ (Randomized Control trial of low glycemic index diet to prevent macrosomia in euglycemic women) found that women assigned to the low GI intervention gained significantly less weight than the control group (mean difference -1.3kgs, 95% CI -2.4 to -0.2; $p = 0.01$) and were less likely to exceed the Institute of Medicine (IOM) gestational weight gain (GWG) recommendations. Compared to the control group, the low GI group also had significantly greater weight loss from pre-pregnancy to 3 months postpartum⁸.

Similarly, a study of Asian women with previous GDM found that after 6 months, women randomised to a low GI diet had significantly greater and reductions in weight, BMI and WHR compared to those following a conventional healthy diet and significantly more women in the low GI group lost at least 5% of weight⁹.

GI and birth defects

Very high glucose levels are toxic to cells and high glucose levels are implicated as one of the causes of birth defects including neural tube defects (NTDs).

In the early stages of pregnancy, the embryo has no beta-cells and is unable to secrete insulin or regulate their own glucose levels. Experimental studies in animal models have confirmed that markedly elevated glucose concentrations contribute to the development of congenital anomalies. High glucose levels in a cell lead to oxidation stress, production of highly reactive oxygen molecules and depletion of substances that encourage the normal closure of the neural tube.

A large case-control study of more than 700,000 births, miscarriages and stillbirths, of which 653 were confirmed as NTD, found that mothers whose diets had a high GI, were more likely to have been overweight at the start of pregnancy and more likely to have had a baby with an NTD¹⁰.



If the women had a high BMI (>29) and a higher GI diet, they were 4-5 times more likely to have given birth to a baby with an NTD. The effect was still present when mothers with a history of diabetes were excluded.

GI and birth weight

An Australian study of over 60 healthy, pregnant women who were assigned to either a low GI diet, or a conventional healthy, high fibre diet for the 2nd and 3rd trimesters of pregnancy found that infants born to the women following the low GI diet were significantly lighter, and had a lower percentage of body fat, compared with the babies of mothers following the conventional diet. More importantly, they were 10 times less likely to deliver a large baby (greater than the 90th percentile), suggesting that a low GI diet could also reduce the chances of childhood obesity¹¹.

GI and gestational diabetes

It is conceivable that adopting a healthy low GI diet early in pregnancy might reduce the risk of developing gestational diabetes – low GI diets have been shown to improve insulin sensitivity, lower postprandial glucose levels and reduce the risk of type 2 diabetes.

While more research is needed, an Australian observational study, found that women who developed gestational diabetes were eating fewer low GI foods than those who did not develop the condition¹².

In women who have been diagnosed with gestational diabetes, a low GI diet has been shown to halve the number needing insulin without compromising obstetric or foetal outcomes¹³.



Summary

A healthy Low GI diet is consistent with healthy eating recommendations but can also help to:

- Prevent excessive weight gain in pregnancy
- Reduce the chance of developing gestational diabetes
- Reduce infant birth weights and likelihood of birth defects or a complicated delivery
- Reduce a child's future risk of obesity, type 2 diabetes and chronic disease

It has benefits for both the pregnant mum and unborn child.*

*For references cited go to <http://www.gisymbol.com/healthcare-professionals/>

For more information on low GI diets and pregnancy visit www.gisymbol.com or www.bumtobabydiet.com

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