



Nutrition, obesity and pregnancy - opportunities or risks in weight management

Young Women and Weight gain

- **35% of Australian women aged 25–35 years are overweight or obese.**
- **The average weight gain for younger women in Australia aged 18-23 years old about 0.67kg/year.**
- **YW twice as likely to gain weight (McTigue et al 2002)**
- **Those with higher BMI more likely to gain weight (McTigue et al 2002, Ball et al 2003)**
- **Implications for the delivery of obstetric care?**



Obesity in Australian pregnant women - increased risk of adverse pregnancy outcomes

14,230 women, 34% were overweight, obese/ morbidly obese.

hypertensive disorders of pregnancy

- **overweight 1.74 obese 3.00, morbidly obese 4.87**

gestational diabetes

- **overweight 1.78 obese 2.95 morbidly obese 7.44**

hospital admission longer than 5 days

- **overweight 1.36 obese 1.49 morbidly obese 3.18**

caesarean section

- **overweight 1.50 obese 2.02 morbidly obese 2.54**

Neonates born to obese and morbidly obese women had

- **increased risk of birth defects (obese 1.58 , morbidly obese 3.41;**
- **hypoglycaemia (obese 2.57 morbidly obese 7.14**
- **increased risk of admission to intensive care 2.77**
- **premature delivery (< 34 weeks' gestation) 2.13**
- **jaundice 1.44**

Calloway et al MJA 2006; 184 (2): 56-59



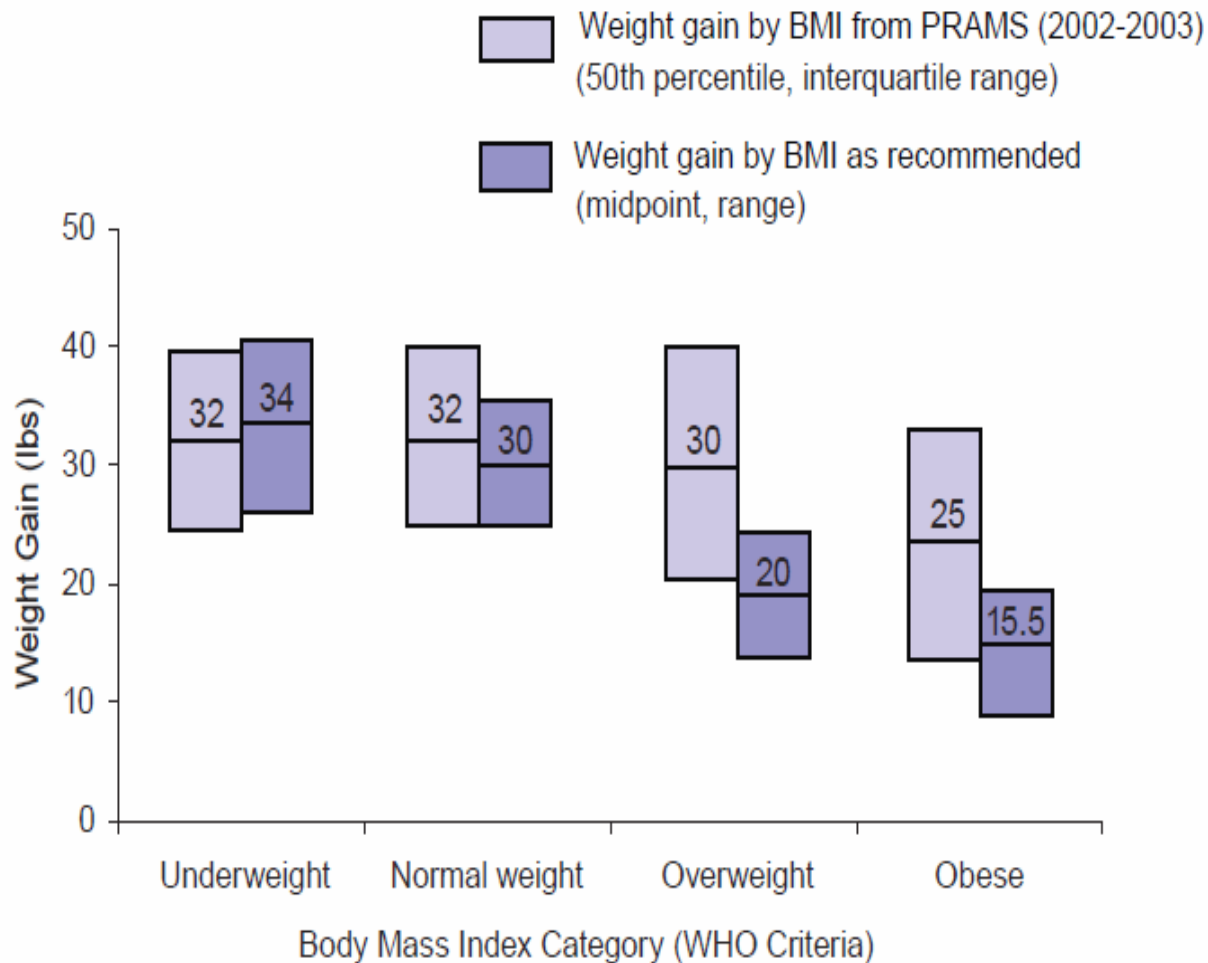
IOM revised Guidelines

TABLE 1: NEW RECOMMENDATIONS FOR TOTAL AND RATE OF WEIGHT GAIN DURING PREGNANCY, BY PREPREGNANCY BMI

Prepregnancy BMI	BMI ⁺ (kg/m ²)	Total Weight Gain (kg	Rates of Weight Gain* 2nd and 3rd Trimester (lbs/week)
Underweight	<18.5	12.7-18	1 (1-1.3)
Normal weight	18.5-24.9	11.4-15.9	1 (0.8-1)
Overweight	25.0-29.9	6.9-11.4	0.6 (0.5-0.7)
Obese (includes all classes)	≥30.0	5-9	0.5 (0.4-0.6)

Weight Gain vs IOM Guidelines

FIGURE 2: CURRENT TRENDS IN WEIGHT GAIN DURING PREGNANCY COMPARED TO THE RECOMMENDED GUIDELINES



Pregravid BMI negatively associated with diet quality

- FFQ derived Diet Quality Index for Pregnancy (DQI-P)
- A total of 2394 women from the Pregnancy, Infection and Nutrition study were included in this analysis.
- **RESULTS:** Evidence of a dose-response relationship was found between BMI and inadequate servings of grains and vegetables, and iron and folate intake.
- Pregravid obesity was associated with 76% increased odds of falling into the lowest diet quality tertile compared with underweight women after controlling for potential confounders.

- Laraia et al 2007

- Suggests that overweight pregnant women be targeted for nutrition programs to improve diet quantity and quality.



Maternal overweight and obesity and the risk of congenital anomalies:

- Obese mothers were at increased odds of pregnancies affected by
- neural tube defects
OR, 1.87;
 - spina bifida
OR, 2.24;
 - cardiovascular anomalies
OR, 1.30;
 - septal anomalies
OR, 1.20

Maternal overweight and obesity and the risk of congenital anomalies: a systematic review and meta-analysis.
Stothard 2009



Folate + micronutrients

- Maternal consumption of folic acid-containing prenatal multivitamins is associated with decreased risk for several congenital anomalies, not only neural tube defects. Meta-analysis. [Goh et al 2006](#)
- 2005 and 2006, 40% of women in Ontario did not achieve the protective 900 nmol/L red blood cell folate, despite flour fortification and the fact that more than half of pregnant women supplemented with prenatal multivitamins. Bar-Oz et al 2008
- “ unless clinicians can be assured that pregnant women will reliably use prenatal vitamin supplements containing 0.8-1.1 mg of folate, the prenatal vitamin supplements should be combined with 5 mg of folate”. (Koren,Goh 2009)



Fats - Long chain omega 3

- It is hypothesized that the intake of long-chain polyunsaturated fatty acids (LC-PUFAs) throughout pregnancy is important to maternal health and fetal and infant development.
- n-3 LC-PUFA supplementation during pregnancy may enhance pregnancy duration and head circumference, but the mean effect size is small. [Szajewska 2006](#)
- supplementation with n-3 LC-PUFA in women with high-risk pregnancies reduced the risk of early preterm delivery in the fatty acid-supplemented group compared with the placebo group, while no other effects on pregnancy outcomes were detected. [Horvath 2007](#)
- Paucity of RCTs on the effect of n-3 fatty acids on depression during pregnancy or the early postpartum period and remains unresolved. [Jensen 2006](#)

Omega-3 fatty acids are found in oily fish like salmon and flaxseed and canola oils



Carbohydrate Quality

- RCT - high and low GI diet during pregnancy in 62 Australian women showed that compared with the low GI group, women in the high GI group gave birth to infants who were significantly heavier (+236g), had a higher birth centile (48 vs 69), a higher ponderal index (2.62 vs 2.74), and a higher prevalence of large-for-gestational age (3.1% vs 33.3%). Further studies are needed to confirm these observations. (Moses 2007)
- Cochrane review: While a low GI diet was seen to be beneficial for some outcomes for both mother and child, results from the review were inconclusive. (Tieu et al 2008)



Protein and birth weight



- RCT found high protein supplements to be associated with depressed birth weight in low-income pregnant women.(Rush 1980)
- Observational study - Mean protein intake >85 g/day was associated with a 71 g decrement in birth weight (n 5163, $p < 0.009$) compared to intermediate (50–84.9 g/day) average protein intake. Sloana et al 2000;
- Observational study of 557 women aged 18-41 y, living in % energy from protein was positively associated with birth weight ($P = 0.02$) and placental weight ($P = 0.07$), independently of energy intake and weight gain during pregnancy, Moore et al 2004

Food Recommendations for Pregnant Women?

- **4 - 6 servings from the bread, cereals, pasta, noodles group.**

- An example of one serve is 2 slices bread; 1 med of cooked rice, pasta or noodles; or 1 1/3 cups of flakes.

- **5 - 6 servings from the vegetables group.**

- **4 servings of fruit.**

- **2 servings from the milk, yoghurt, cheese group.**

- **1 ½ servings from the meat, fish, poultry, eggs, nuts and legumes group.**

- **3 tsp margarine/oil**

KJ	8700-10,000
Protein	99-111g
Fat	54g
Carb	286-344
Fibre	49-55g
Folate	470ug
Iron	20-22mg
Zinc	17-18mg

Nutrient Recommendations

Nutrient	Non pregnant	Pregnant (19-30y)
Pregnancy Estimated Energy Requirement		
All ages		60
1st trimester No additional energy		1.4
2nd trimester Additional 1.0		18
3rd trimester Additional 1.0		1.9
B6 mg		2.6
B12 ug		600
Folate ug		800
Vit A ug		60
Vitamin C		1000
Calcium/Ph mg		27
Iron mg		350
Mg mg		220
Iodine ug		11
Zinc mg		

Ingredients Listings

Vitamin B1	1.55 mg
Vitamin B2	1.8 mg
Vitamin B3	19 mg
Vitamin B5	10 mg
Vitamin B6	2.6 mg
Vitamin B12	4.0 µg
Vitamin C	100 mg
Vitamin D3	12.5 µg
Vitamin E	15 mg
Vitamin H	200 µg
Folic Acid	800 µg
Calcium	125 mg
Iron	60 mg
Magnesium	100 mg
Phosphorus	125 mg
Copper	1 mg
Magnanese	1 mg
Zinc	7.5 mg

Weight Gain Restriction in at risk Women

- Treatment of gestational diabetes with diet, blood glucose monitoring and insulin as required was associated with a lower frequency of a diagnosis of preeclampsia, 4 fold reductions in serious perinatal morbidity and improvements in the women's health-related quality of life. The intervention group gained significantly less weight than the control group (8.1 ± 0.3 vs 9.8 ± 0.4 kg $p=0.01$).
- A lifestyle intervention targeting weight gain restriction in women with gestational diabetes found that those who gained weight had a higher percentage of macrosomic infants than those subjects who lost weight or had no weight change during pregnancy
- Crowther et al



Conclusions

- **Opportunities**

- Nutritional management of women of childbearing age before conception, during and after pregnancy to improve health outcomes for mother and child.
- Monitoring weight gain as well as nutritional status are important components of conceptual care.

- **Risks**

- Little data on effective programs for women of child bearing age and pregnant women
- Research on dietary composition in pregnancy undeveloped.
- Weight focus – risk or opportunity?

