

Excess weight gain in pregnancy: contributing factors and adverse outcomes in a Western-Australian population study.

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BACKGROUND

- Gestational weight gain (GWG) above what is needed to meet the requirements of pregnancy is termed 'excess gestational weight gain'.
- Women with excess GWG are more likely to experience adverse perinatal outcomes, such as caesarean delivery, gestational diabetes, preeclampsia, macrosomia and preterm birth.
- Overweight and obese women are more likely to have excess GWG. With half of Australia's pregnant population falling into this category, this topic is a major public health concern.
- The Institute of Medicine (IOM) 2009 guidelines provide target weight gain ranges based on pre-pregnancy BMI that are associated with the least risk of adverse outcomes¹. These guidelines are as follows;

Table 1. Institute of Medicine 2009 Healthy Weight Gain in Pregnancy guidelines.

Pre-pregnancy BMI (kg/m ²)	Classification	Singleton total weight gain range (kg)
<18.5	Underweight	12.5 - 18
18.5 – 24.9	Normal	11.5 - 16
25 – 29.9	Overweight	7 – 11.5
≥30	Obese	5 - 9

AIM

To identify factors that contribute to excess gestational weight gain and the resulting adverse outcomes, in order to facilitate early intervention to reduce the risk of perinatal morbidity.

METHODS

- A retrospective audit was performed of all pregnancies which delivered in January to September 2017. 1891 women were included in the study after exclusions for multiple gestation and missing BMI data.
- Women were classified as 'not excess GWG' or 'excess GWG' using the 2009 IOM guidelines and first trimester BMI recorded at booking visit.
- Data on maternal characteristics, comorbidities, medications, and adverse outcomes were collected from electronic medical records BOSSNet and Stork.
- Statistical analysis was performed with significance at p <0.05.

RESULTS AND DISCUSSION

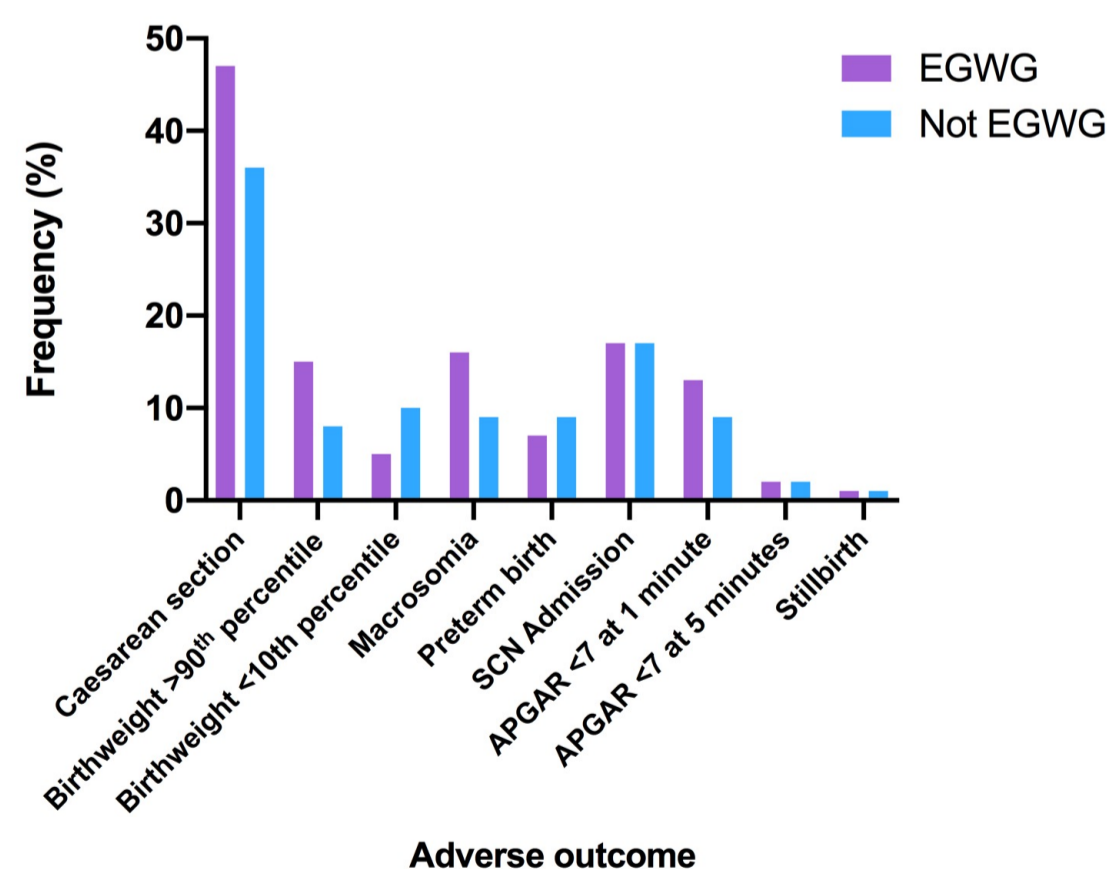
- Of the 1891 pregnancies, 29.4% were characterised by excess GWG. This is lower than elsewhere in the literature, where excess GWG has occurred in 38 – 47% of pregnancies².
- Overall, factors that increased the risk of excess GWG included; being overweight/obese at booking visit, aged <30 years, primiparity, using antihypertensives or antibiotics in pregnancy, as outlined in Table 2.
- Gestational diabetes was associated with a lower frequency of excess GWG.
- Other medications and comorbidities did not show a strong association with excess GWG.

Table 2. Demographics, comorbidities and medication use.

	Excess GWG Mean ± SD n (%)	Not excess GWG Mean ± SD n (%)	Significance p<0.05
Number of women	556 (29.4)	1335 (70.6)	
Age (years)	29.7 ± 5.2	30.5 ± 5.1	0.0020*
Booking visit BMI	28.2 ± 6.4	26.1 ± 6.9	0.0001*
Trimester 3 BMI	34.6 ± 5.9	29.1 ± 6.2	0.0001*
Pre-pregnancy weight group:			
Underweight	13 (2.3)	70 (5.2)	0.0050*
Normal	177 (31.8)	691 (51.8)	<0.0001*
Overweight	180 (32.4)	291 (21.8)	<0.0001*
Obese	184 (33.1)	281 (21.0)	<0.0001*
Primiparous	283 (50.9)	552 (41.3)	0.0001*
Comorbidities:			
Gestational diabetes	104 (18.7)	345 (25.8)	0.0009*
Group B Streptococcus	77 (13.8)	205 (15.4)	0.40
Vitamin D deficiency	46 (8.3)	122 (9.1)	0.54
Asthma	34 (6.1)	69 (5.2)	0.40
Hypothyroidism	31 (5.6)	72 (5.4)	0.87
Depression	38 (6.8)	82 (6.1)	0.57
Anxiety	30 (5.4)	57 (4.3)	0.28
Iron deficiency anemia	19 (3.4)	68 (5.1)	0.11
Iron deficiency, no anemia	38 (6.8)	118 (8.8)	0.14
Gastrointestinal conditions	17 (3.1)	33 (2.5)	0.46
Herpes	5 (0.9)	13 (0.9)	0.99
Polycystic ovarian syndrome	18 (3.2)	30 (2.2)	0.26
Medications:			
Iron	262 (47.0)	691 (51.8)	0.06
Insulin	67 (12.0)	218 (16.3)	0.0178*
Vitamin D	158 (28.4)	436 (32.7)	0.0702
Pregnancy multivitamin	308 (55.3)	714 (53.5)	0.44
Folate	55 (9.9)	126 (9.4)	0.79
Anti-depressant	28 (5.02)	50 (3.7)	0.22
Anti-hypertensive	14 (2.5)	14 (1.0)	0.0159*
Bronchodilator	18 (3.2)	41 (3.1)	0.87
Progesterone	5 (0.9)	12 (0.9)	0.99
Thyroxine	33 (5.9)	77 (5.8)	0.88
Steroids (Aerosol/IM/oral)	19 (3.4)	44 (3.3)	0.89
Antibiotics in pregnancy	38 (6.8)	58 (4.3)	0.0246*

- Excess GWG had a higher frequency of caesarean section, birthweight >90th percentile, macrosomia and low APGAR at one minute, outlined in Figure 1 below, compared to those without excess weight gain. This emphasises that despite IOM guidelines being in place, more work is needed to prevent excess GWG and the associated adverse outcomes.

Adverse perinatal outcomes based on weight gain



CONCLUSION

- Gaining weight in excess of IOM recommendations is still a common occurrence and must be addressed. Women with a high pre-pregnancy BMI, a young age, or primiparity are of high risk for excess GWG and future studies are warranted investigating ways to target this group, to prevent adverse outcomes.

1. Institute of Medicine. (2009). *Weight gain during pregnancy: Reexamining the guidelines*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/20669500>
 2. Goldstein, R. F., Abell, S. K., Ranasinha, S., et al. (2017). Association of gestational weight gain with maternal and infant outcomes: A systematic review and meta-analysis. *Journal of the American Medical Association*, 317(21), 2207-2225. doi:10.1001/jama.2017.3635