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Maternal obesity and gestational weight gain: associations with maternal and infant outcomes

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Obesity among women of childbearing age has become a major public health issue with one in five women now entering pregnancy classified as obese[(1)]. In addition to pre pregnancy body mass index (BMI), excessive gestational weight gain (GWG) has been implicated as a risk factor for complications during pregnancy and can lead to retained weight postpartum and increased rates of obesity[(2)]. Currently there are no evidence-based UK guidelines on appropriate GWG, with the routine weighing of women being discouraged[(3)]. The aim of this study was to examine the influence of BMI and GWG on maternal and infant birth outcomes across normal weight, overweight and obese pregnant women.

Pregnant women (N = 240) without pregnancy complications, aged >18 years and having a singleton pregnancy were recruited from antenatal clinics in the Western Health and Social Care Trust in Northern Ireland. Body weight (kg) was measured at 12, 28 and 36 weeks' gestation. Infant anthropometric measures at birth and other relevant health outcomes were recorded from maternal and paediatric notes. GWG and health outcomes were assessed, between and within BMI groups. Data were not normally distributed and are presented as median and interquartile range (IQR); non-parametric Kruskal-Wallis and Mann-Whitney U tests were used as appropriate. GWG was calculated for each BMI group and classified as either low or high GWG according to being below or above the median within each group.

Normal weight women had significantly higher GWG (11·4 (9·0–13·4) kg) than those who were overweight (8·1 (6·6–12·2) kg) or obese (8·8 (3·6–11·7) kg), (normal vs overweight p = 0·004, normal vs obese p = 0·029). There were no significant differences in birth outcomes between BMI groups. Normal weight women who were in the high GWG group required significantly more assisted deliveries than normal weight women in the low GWG group (Table 1). These differences were not observed in the overweight or obese group (data not shown).

Table 1. Maternal and infant pregnancy outcomes according to high or low GWG of normal weight women.

	Normal weight pregnant women				
Birth outcomes	Low GWG (≤ 9·1 kg) N = 26		High GWG (≥ 13·4 kg) N = 25		P value
Infant					
Birthweight (kg)	3·5	3·2, 3·8	3·6	3·3, 3·8	0·137
Length (cm)	52·2	49·7, 52·5	53·0	51·5, 55·5	0·646
Head circumference (cm)	35·0	34·0, 36·0	35·0	34·8, 36·0	0·138
Maternal					
Total GWG (kg)	9·1	8·1, 10·7	13·4	12·1, 14·8	0·001
Systolic BP (mm/Hg)	121·0	104·0, 127·0	116·0	109·0, 127·0	0·581
Diastolic BP (mm/Hg)	72·5	64·0, 78·5	72·0	68·0, 82·0	0·785
Delivery	n	%	n	%	
Vaginal	18	69·2	11	44	0·062
Assisted	8	30·8	14	56	0·031

Normal weight classified as 18·5-24·9 kg/m^2 according to WHO (2016). BP-blood pressure. Mann-Whitney U and chi square tests used as appropriate. Values presented as median (IQR), n and percentage.

These findings demonstrate that in normal weight women, a higher GWG is associated with an increased need for assisted delivery. This research highlights the need for revised maternal policy on the monitoring of weight gain during pregnancy with the view to improving maternal and infant outcomes.

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