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Childhood obesity is associated with maternal nutrition and gestational weight gain

M. S. Charnley¹, J. C. Abayomi¹ and A. Weeks²¹Faculty of Education, Community and Leisure, Liverpool John Moores University, Liverpool, UK and ²Liverpool Women's Hospital, Crown Street, Liverpool, UK

It has been established that pre-gravid body mass index (BMI) and gestational weight gain (GWG) are associated with adverse obstetric outcomes⁽¹⁾. Furthermore, maternal behaviours with regard to dietary intake have been shown to impact on the risk for obesity in offspring⁽²⁾. Over-nutrition during pregnancy and the subsequent mismatching of offspring into an obesogenic environment predicate risk. The 'Barker Hypothesis' proposes the link between low for gestational age birth-weight and coronary heart disease (CHD)⁽³⁾. Epidemiological and animal model studies also demonstrate that an adverse inter-uterine environment can effect predictive adaptive responses (PAR) in the fetus resulting in macrosomia and increased risk for obesity, type 2 diabetes mellitus and other non-communicable diseases in later life⁽⁴⁾. The aim of this study was to investigate the associations between dietary intake in obese pregnant women relative to GWG and infant birth weight (BW). Participants were asked to complete three-day food diaries during each trimester of pregnancy. Data regarding food portion size was verified using a food atlas⁽⁵⁾ and the diaries were then analysed using Microdiet.

Table 1 Maternal weight and birth weight characteristics with total energy intakes (kcal)

	BMI 11wks (n = 140)	BW (n = 134)	GW 28wks (n = 115)	GW 36wks (n = 39)	Energy intake at 16wks (n = 93)	Energy intake at 28wks (n = 99)	Energy intake at 36wks (n = 73)
Mean	40	3.6	113.8	113.9	1849	1984	2066
sd	5.1	0.67	15.9	14.4	590.7	525.7	587.2
Median	38	3.6	112	112	1750	1971	2027
SE	0.43	0.06	1.5	2.3	61.2	52.8	68.7
Min	35	1.23	87.7	90	764	870	483
Max	68.6	5.72	188	156.9	4142	3966	3610

Data were collected for 140 women with a BMI ≥ 35 kg/m² and a mean booking in weight of 110.2 kg (sd 15.7). Data shows a moderate mean GWG of <4 kg (sd 14.4), a mean BW of 3.6 kg (sd 0.67). The mean total energy intake is consistent with estimated average requirements for energy during pregnancy. However, a statistically significant negative correlation between energy intake at 36 weeks and BW ($\rho = -0.249$, $p = 0.033$ Spearman's) and a positive correlation between GW at 36 weeks and BW ($\rho = 0.322$, $p = 0.046$ Spearman's) was demonstrated. Pregnancy is seen as a key window of opportunity to modify lifestyle behaviours and further research into effective and acceptable interventions, that reduces immediate obstetric risk and long term risk to offspring for obesity, CHD and other dietary related diseases, is needed.

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