



Is maternal dietary macronutrient composition in pregnancy associated with offspring birthweight?

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Evidence is inconsistent concerning the effect of macronutrient dietary composition (carbohydrate [CHO], protein and fat) during pregnancy on adverse birth outcomes^(1,2,3). The aim of our study was to explore whether maternal dietary macronutrient intake in the first trimester was associated with offspring birthweight.

A prospective cohort⁽⁴⁾ of 1,196 pregnant women in Leeds, UK provided a 24 hour dietary recall. Additional information on alcohol intake and smoking status was collected. Multiple linear regression models analysed the association between maternal macronutrient dietary intake in the first trimester and birthweight. Models were adjusted for confounders including ethnicity, parity, gestational age at delivery, maternal height, weight and neonatal gender, and mutually adjusted for energy contributing macronutrients (Model 1). Model 2 was additionally adjusted for alcohol intake and smoking status.

Macronutrient = intake 10 g/day increment Trimester 1 n = 1,196	Birthweight (g), Model 1			Birthweight (g), Model 2		
	Birthweight ^a	95 % CI	p value	Birthweight ^{a,b}	95 % CI	p value
Total carbohydrate (g)	4	2 to 7	0.002	4	1 to 7	0.003
Total fat (g)	-11	-18 to -3	0.006	-8	-16 to -0.3	0.04
Protein (g)	11	0.5 to 21	0.04	8	-2 to 19	0.12

^aMutually adjusted for other energy contributing macronutrients ^aAdjusted for maternal weight, height, ethnicity, parity, gestational age at delivery, sex of baby

^bAdditional adjustment for average alcohol intake and smoking status

Results showed that each additional 10 g/day CHO consumption in the first trimester was associated with an increase of 4 g (95 % CI 1 to 7; P = 0.003) in birthweight. Conversely, each additional 10 g/day fat consumption was associated with a decrease of 8 g (95 % CI 0.3 to 16; P = 0.04) in birthweight. There was no evidence of an association between protein intake and birthweight after adjusting for alcohol intake and smoking habits.

Fat and CHO consumption in the first trimester could play a role in optimising birthweight. We recommend an appropriate balance of carbohydrate and fat intake during pregnancy.

1. Moore VM, Davies MJ, Willson KJ *et al.* (2004) *J Nutr* **134**, 1820–1826.
2. Chong MF-F, Chia AR, Colega M *et al.* (2015) *J Nutr* **145**, 1303–1310.
3. Lagiou P, Tamimi RM, Mucci LA, *et al.* (2004) *Eur J Clin Nutr* **58**, 231–237.
4. Boylan SM, Cade JE, Kirk SFL *et al.* (2008) *Br J Nutr* **100**, 875–82.