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Birth outcomes relative to dietary vitamin D & calcium intake in obese pregnant women

M. S. Charnley[1], J. C. Abayomi[1] and A. Weeks[2]
[1]*Faculty of Education, Community and Leisure, Liverpool John Moores University, IM Marsh Campus, Barkhill Road, Liverpool L17 6BD and* [2]*Liverpool Women's Hospital, Crown Street, Liverpool L8 7SS, UK*

For individuals with limited exposure to ultra-violet B, a recommended nutrient intake (RNI) of 10 µg/day of vitamin D is recommended; this includes all pregnant and lactating women[(1)]. Despite this, research suggests a subset of pregnant women are at risk of vitamin D insufficiency due to obesity, darker skin pigmentation and estimated delivery date in spring or summer[(2)]. There is no increase in requirements for calcium during pregnancy however a positive maternal calcium balance is dependent on adequate circulating levels of $25(OH)D_3$[(3)]. Maternal outcomes such as gestational diabetes, pre-eclampsia and increased risk of caesarean section are all associated with low vitamin D status[(4)]. The aim of this study was to investigate whether dietary intakes of vitamin D and calcium were associated with adverse maternal and birth outcomes. 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. Mean Vitamin D and calcium intake over 3 trimesters

	Total energy		Vitamin D					Calcium	
	Mean Kcals/d	**SD**	**Mean µg/d**	**SD**	**RNI % 10 µg/d**	**Mean mg/d**	**SD**	**RNI % 700mg/d**	**LRNI % 400mg/d**
Visit 1 16–20wks (*n* = 93)	1849	590.7	2.6	2.5	26	875	334.4	125	219
Visit 2 28wks (*n* = 99)	1984	525.6	2.4	2	24	949	356.8	136	237
Visit 3 36wks (*n* = 73)	2066	587.2	2.74	2.5	27	994	423.6	144	252

Data were collected for 140 women with a BMI $\geq 35\,kg/m^2$ ($n = 139$), a mean booking-in weight of 110kg (SD 15.5) and mean birth weight of 3.57 kg (SD 0.67). Most women achieved total energy requirements at all 3 visits however there was a wide distribution around the mean with an average minimum intake of 706 kcals for all 3 visits and a maximum intake of 3906 kcals. There was a positive dietary intake for calcium with 73.6 % of women achieving RNI and 95.7 % achieving LRNI. Dietary intake of vitamin D was low with only 2.2 % of women achieving RNI at all 3 visits. Spearman's correlation suggests an association with vitamin D and birth weight (rho = 0.224, $p = 0.036$) at visit 1. This suggests that vitamin D status in early pregnancy may influence birth weight and that pre-natal supplements may be necessary. Results indicate that further investigation into the quality of maternal diet and pregnancy outcomes is required.

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