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# Validation of a semi-quantitative food frequency questionnaire administered to pregnant women in Belfast

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Maternal nutritional intake is a key determinant of various aspects of pregnancy such as healthy development of the fetus and the mother's own glycemic control. Increased maternal plasma glucose (gestational diabetes) is correlated with the incidence of macrosomia. Recently, the Hyperglycemia and Adverse Pregnancy Outcomes[(1)] study has most clearly shown that adverse outcomes, such as increased birth weight, occur at levels of hyperglycemia less severe than the criteria currently used to diagnose gestational diabetes. This means that maintenance of normal glycemic control in pregnancy is even more important than previously thought. To study the impact of maternal nutrient intake on maternal glycemic control and outcomes of pregnancy, it is important to first, quantify nutrient intake in pregnancy using a validated tool. As part of our larger study, we aim to examine nutrient intake of pregnant women in Belfast and study the impact of this on the outcome of their pregnancy. However, first, we aim to validate our test method, a semi-quantitative food frequency questionnaire (FFQ), so that we can proceed with confidence. For this validation process, we aim to use the 7-d food diary (FD) as a reference method, the known gold standard for measuring nutritional intake.

The FFQ used within this research has been adapted from one used within the Avon Longitudinal Study of Pregnancy and Childhood[(2)]. Data from the FFQ was entered into NETWSIP; data from the FD was entered into Q Builder (nutritional analysis software). *n* 40 women completed an FFQ and FD. Data from the FFQ was entered into NETWSIP; data from the FD was entered into Q Builder (nutritional analysis software). Means, SD, correlation, bias and limits of agreement[(3)] were calculated using SPSS 17.0 (SPSS Inc, Chicago, IL, USA).

From the FFQ, mean (SD) energy was 1888 (401) kcal and carbohydrate 271 (61) g. From FD, corresponding results were 2129 (463) kcal and 262 (64) g, respectively. Spearman correlation coefficients between the two methods were 0.63 (energy) and 0.93 (carbohydrate). Bias and limits of agreement were 240 (−374 to 856) kcal for energy and 20 (−49 to 31) g for carbohydrate. Percentage (Cohen's kappa) of women categorized into the same or adjacent fifth of the FD distribution was 75% (0.48) for energy and 95% (0.90) for carbohydrate.

The FFQ estimates energy and protein intake adequately. It underestimates fat intake and overestimates carbohydrate intake. This is expected, given that the FFQ is reporting usual intake and the FD is reporting actual intake. For nutritional coefficients affecting carbohydrate metabolism (energy, carbohydrate, fibre, starch, sugars and vitamin E), the FFQ is a satisfactory tool for estimating usual intake.

In light of these findings, we can confidently proceed with examining nutrient intake in pregnant women, using the test FFQ, to determine the influence of nutrient intake on the outcome of their pregnancy.

| | FFQ (*n* 20) | | | 7-d food diary (*n* 20) | | | |
|---|---|---|---|---|---|---|---|
| | Mean | SD | Median | Mean | SD | Median | Correlation |
| Energy (kcal) | 1888.3 | 401.7 | 1793.5 | 2129 | 463.5 | 2043 | 0.63** |
| Carbohydrate (g) | 271.7 | 61.3 | 258.1 | 262.6 | 64.1 | 244.6 | 0.93** |
| Protein (g) | 76.1 | 17.7 | 76.7 | 79.1 | 18.3 | 78.8 | 0.40* |
| Total fat (g) | 63.5 | 20.4 | 58.7 | 90.3 | 23 | 89.9 | 0.29 |

**Significant at the 0.01 level (two-tailed); *significant at the 0.05 level (two-tailed).

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