**Supplementary Text**

The supplementary text contains further information with regards to the detailed investigation of missing data, sensitivity analysis and casual mediation analysis undertaken.

**Supplementary Text 1: Investigation of missing data**

1. Little’s chi-square missing completely at random (covariate dependent missingness) test

Attrition is common in follow-up of randomised controlled trials. The most basic assumption commonly made is to assume that the observation is missing at a particular time-point for random reasons; termed ‘missing completely at random’ (MCAR) and independent of other outcomes and predictors of missingness. A less stringent case of MCAR is covariate dependent missingness (CDM), which is particular useful for longitudinal studies and follow-up of randomised controlled trials (1). This assumption allows missing data to increase across time and MCAR is thought of as an assumption of conditional independence. This test utilises multivariate normal estimates from the. The tested co-variates were tested jointly under the covariate dependent missingness assumption using 200 iterations in the expectation-maximization algorithm (1).

Independent variables: Maternal- glycaemic load, glycaemic index, carbohydrate, saturated fat, protein, fibre, energy intake at 6-months postpartum. Infant- weight, height, upper midarm upper circumference, crown-rump length, occipito-frontal circumference, abdominal circumference, triceps skinfold thickness and subscapular skinfold thickness.

Dependent variables (predictors of missingness): Maternal ethnicity, BMI at trial entry (15+0-18+6 weeks), parity, randomisation allocation and time. Time was categorised as t=3 for this 6-month follow-up visit (trial entry at 15+0 to 18+6 weeks’ t=0).

Infant weight-z scores, height-z scores, BMI-z scores, weight-for-length z-scores, sum of skin folds and total body fat estimation (%) were not assessed as were calculated variables and would introduce collinearity within the model.

1. Sensitivity of results to departure from the assumption that any missing data was missing at random

This analysis was undertaken using the STATA program rctmiss for the primary outcome of this study (infant adiposity as assessed as sum of subscapular and triceps skinfold thicknesses at 6-months of age)(2). This method considers possible effects of data being ‘Missing not a random’. This assumption is not covered by standard methods such as multiple regression and multiple imputation which both assume ‘missing at random’. For the purpose of this analyses δ was assumed as .5, .75, 1, 1.5, 2.

Results

Sensitivity analysis

There was no evidence for trial outcomes being missing anything more than completely at random (p = 0.856). In this study, when we assume an extreme scenario of deviation from MAR, i.e the difference in infant subscapular thickness among missing infants in the intervention arm is half that in the observed infants, with no difference in the control arm, then the mean difference is -0.60mm (δ= 0.5, SE -0.34). In comparison if we simulated the difference in infant triceps skinfold thickness among missing infants within the intervention arm is double that in the observed infants with no difference in the control arm, then the mean difference is -0.13mm (δ=2, SE 0.22) (Supplementary table 5 & Supplementary Figure 2). Furthermore with regards to the infant subscapular skinfold thickness, regardless of assumptions of missingness made, there appears to be a significant treatment effect (Supplementary table 4 & Supplementary Figure 1).

**Supplementary Table 1a:** Maternal demographics of those who consented to 6 months follow up versus those who did not by randomisation allocation.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Maternal |  | Followed up | Mean difference/ OR (95%CI)\* |  | Not followed up | Mean difference/ OR (95% CI) \* | Follow up vs. no follow-up p-value  |
|  | Intervention  |  | Control  |  | Intervention  |  | Control |
| Maternal age (years) |  | N=355 | 31.39 (5.09) | N=365 | 30.96 (5.54) | 0.43 (-0.35 to 1.21) | N=407 | 29.74 (5.68) | N=392 | 29.94 (5.49) | -0.20 -0.98 to 0.57) | <0.001 |
| Maternal BMI (kg/m2) |  | N=355 | 36.27 (5.06) | N=365 | 36.36 (4.72) | -0.09 (-0.81 to 0.62) | N=407 | 36.36 (4.84) | N=392 | 36.20 (4.50) | 0.16 (-0.48 to 0.81) | 0.894 |
| Maternal ethnicity | Asian | N=355 | 14 (3.9) | N=365 | 11 (3) | 1.31 (0.60 to 2.84) | N=407 | 29 (7.1) | N=392 | 37 (9.4) | 0.75 (0.47 to 1.20) | <0.001 |
| Black | 65 (18.3) | 76 (20.8) | 0.88 (0.65 to 1.18) | 128 (31.4) | 118 (30.1) | 1.01 (0.85 to 1.29) | <0.001 |
| White | 21 (5.9) | 22 (6.0) | 0.98 (0.55 to 1.75) | 23 (5.7) | 18 (4.6) | 1.23 (0.67 to 2.24) | <0.001 |
| Other  | 255 (71.8) | 256 (70.1) | 1.02 (0.93 to 1.12) | 227 (55.8) | 219 (55.9) | 1.00 (0.88 to 1.13) | 0.474 |
| Multiparous |  | N=355 | 176 (49.6) | N=365 | 178 (48.8) | 1.02 (0.88 to 1.18) | N=407 | 260 (63.9) | N=392 | 245 (62.5) | 1.02 (0.92 to 1.14) | <0.001 |
| Current smoker  |  | N=355 | 8 (2.3) | N=365 | 20 (5.5) | 0.41 (0.18 to 0.92) | N=407 | 39 (9.6) | N=392 | 38 (9.7) | 0.99 (0.65 to 1.51) | <0.001 |
| IMD quintiles | 1  | N=354 | 16 (4.5) | N=364 | 19 (5.2) | - | N=403 | 13 (3.2) | N=392 | 15 (3.8) | - | 0.164 |
| 2 | 30 (8.5) | 19 (5.2) | 1.87 (0.78 to 4.52) | 26 (6.5) | 25 (6.4) | 1.20 (0.48 to 3.02) |
| 3 | 37 (10.5) | 40 (11.0) | 1.10 (0.49 to 2.45) | 50 (12.4) | 44 (11.2) | 1.31 (0.56 to 3.06) |
| 4 | 122 (34.5) | 140 (38.5) | 1.03 (0.51 to 2.10) | 117 (29.0) | 138 (35.2) | 0.98 (0.45 to 2.14) |
| 5 | 149 (42.1) | 146 (40.1) | 1.21 (0.60 to 2.45) | 197 (48.9) | 170 (43.4) | 1.34 (0.62 to 2.89) |
| Maternal anthropometry | Sum of skin folds (cm) | N=349 | 124.06 (28.23) | N=363 | 122.28 (25.49) | 1.79 (-2.17 to 5.75) | N=401 | 121.27 (28.6) | N=386 | 123.42 (27.22) | -2.15 (-6.06 to 1.76) | 0.560 |
| Antenatal history | GDM | N=349 | 102 (29.2) | N=355 | 96 (27.0) | 1.08 (0.85 to 1.37) | N=287 | 60 (20.9) | N=306 | 77 (25.2) | 0.83 (0.62 to 1.12) | 0.041 |
| PET | N=352 | 11 (3.1) | N=362 | 11 (3.0) | 1.03 (0.45 to 2.34) | N=392 | 16 (4.1) | N=382 | 16 (4.2) | 0.97 (0.49 to 1.92) | 0.280 |
| Total gestational weight gain from pre-pregnancy weight | N=333 | 6.88 (4.70) | N=341 | 7.82 (4.42) | -0.93 (-1.62 to -0.24) | N=193 | 7.71 (4.35) | N=226 | 7.76 (4.59) | -0.05(-0.91 to 0.81) | 0.176 |

\*Difference calculated for maternal offspring followed up (intervention vs. control) & those not followed up (intervention vs. control) at 6-months postpartum.

**Supplementary Table 1b:** Infant characteristics of those who consented to 6 months follow up versus those who did not by randomisation allocation.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Follow up at 6 months |  | No follow up | Mean Difference/ Odds ratio (95% Confidence Intervals) | p-value |
|  | Mean (SD)/N(%) |  | Mean (SD)/N(%) |
| Birth characteristics | Gestation at birth (weeks) | N=720 | 39.64 (1.95) | N=799 | 39.37 (2.54) | 0.26 (0.04 to 0.49) | 0.022 |
| Admission to NICU | N=720  | 56 (7.8) | N=799 | 66 (8.3) | 0.94 (0.67 to 1.32) | 0.730 |
| Breastfeeding at birth  | N=717 | 445 (62.1) | N=776 | 416 (53.6) | 1.16 (1.06 to 1.26) | 0.001 |
| Anthropometry | Birthweight (grams) | N=720 | 3457.62 (565.18) | N=799 | 3390.11 (647.71) | 67.51 (6.46 to 128.56) | 0.030 |
| Birthweight >4kg | N=720 | 102 (14.2) | N=799 | 108 (13.5) | 1.05 (0.82 to 1.35) | 0.714 |
| LGA >90th  | N=720 | 60 (8.3) | N=799 | 73 (9.1) | 0.91 (0.66 to 1.26) | 0.581 |
| SGA <10th  | N=720 | 84 (11.7) | N=799 | 92 (11.5) | 1.01 (0.77 to 1.34) | 0.926 |
| Subscapular skinfold thickness (mm) | N=354 | 10.87 (2.64) | N=148 | 11.06 (2.64) | -0.20 (-0.33 to 0.23) | 0.731 |
| Triceps skinfold thickness (mm) | N=363 | 5.26 (1.53) | N=154 | 5.41 (1.46) | -0.15 (-0.43 to 0.13) | 0.291 |
| Sum of skinfold thickness (mm) | N=354 | 10.87 (2.64) | N=148 | 11.06 (2.64) | -0.20 (-0.70 to 0.31) | 0.731 |
| Abdominal circumference (cm) | N=386 | 11.45 (1.10) | N=182 | 11.54 (1.10) | -0.09 (-0.28 to 0.10) | 0.360 |
| Mid-arm circumference (cm) | N=414 | 11.45 (1.10) | N=148 | 11.06 (2.34) | -0.20 (-0.70 to 0.31) | 0.443 |

**Supplementary Table 2:** Effect of the UPBEAT Intervention on measures of infant anthropometry measured at 6 months postpartum

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Intervention  | Control  | Mean Diff/ Risk Ratio\* (95% CI) | p-value |
| Mean (SD) | Mean (SD) |
| Total body fat estimation (%) ‡ | N=267 | 19.40 (5.00) | N=280 | 20.20 (5.07) | -0.80 (-1.65 to 0.04) | 0.062 |
| Subscapular Triceps ratio | N=267 | 0.83 (0.22) | N=280 | 0.85 (0.23) | -0.01 (-0.05 to 0.02) | 0.423 |
| Weight (kg) | N=332 | 7.93 (1.07) | N=345 | 8.03 (1.08) | -0.09 (-0.24 to 0.06) | 0.251 |
| Weight for age z-scores\*\* | N=321 | 0.20 (1.08) | N=322 | 0.29 (1.12) | -0.09 (-0.26 to 0.08) | 0.288 |
| Length (cm) | N=321 | 67.41 (8.58) | N=338 | 66.37 (12.37) | 1.21 (-0.40 to 2.81) | 0.140 |
| Length z-scores\*\*  | N=309 | 0.53 (1.79) | N=313 | 0.55 (1.89) | -0.02 (-0.30 to 0.27) | 0.916 |
| Waist length ratio | N=315 | 0.64 (0.08) | N=328 | 0.64 (0.10) | 0.00 (-0.01 to 0.02) | 0.928 |
| Weight for length z-score \*\* | N=314 | -0.08 (1.79) | N=324 | 0.08 (1.63) | -0.18 (-0.45 to 0.09) | 0.184 |
| Mid Upper Arm circumference (cm) | N=329 | 15.30 (1.49) | N=347 | 15.39 (2.08) | -0.10 (-0.39 to 0.19) | 0.511 |
| Crown rump length (cm) | N=186 | 45.16 (2.89) | N=195  | 45.14 (3.06) | 0.04 (-0.57 to 0.65) | 0.897 |
| Occiptofrontal circumference (cm) | N=327 | 43.69 (3.48) | N=343 | 43.81 (4.21) | -0.10 (-0.69 to 0.49) | 0.747 |

\*Treatment effect adjusted for minimisation variables of randomisation (maternal BMI, ethnicity and parity), infant age at 6 month follow up and infant sex.

\*\*Z-scores calculated using WHO Anthro; version 3.2.2) (de Onis et al).(3)

‡ Infant total body fat estimation calculated using sex-specific equations with two skin fold measurements as published by Slaughter et al (1988) (4). For male infants, total body fat estimation was calculated= 1.21(∑ infant sum of skin folds)-0.008 (∑ infant sum of skin folds)-1.7. For female infants, total body fat estimation was calculated= 1.33 (∑ infant sum of skin folds)-0.013 (∑ infant sum of skin folds)-2.5.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Intervention (n=) | Control (n=) | Mean Diff/ Risk Ratio\* (95% CI) | p-value |
| Mean (SD)/N(%) | Mean (SD)/N(%) |
| Subscapular (mm) | N=267 | 7.55 (1.86) | N=281 | 7.95 (2.03) | -0.39 (-0.71 to -0.07) | 0.016 |
| Triceps (mm) | N=307 | 9.69 (2.76) | N=320 | 9.87 (2.69) | -0.21 (-0.64 to 0.21) | 0.327 |
| Sum of skinfolds (mm) | N=267 | 17.08 (3.93) | N=280  | 17.71 (3.97) | -0.63 (-1.30 to 0.03) | 0.062 |
| Total body fat estimation (%) ‡ | N=267 | 19.40 (5.00) | N=280 | 20.20 (5.07) | -0.81 (-1.66 to 0.03) | 0.059 |
| Weight (kg) | N=332 | 7.93 (1.07) | N=345 | 8.03 (1.08) | -0.10 (-0.25 to 0.06) | 0.216 |
| Height (cm) | N=321 | 67.41 (8.58) | N=338 | 66.37 (12.37) | 1.31 (-0.33 to 2.96) | 0.118 |
| Weight z-scores\*\* | N=321 | 0.20 (1.08) | N=322 | 0.28 (1.13) | -0.10 (-0.27 TO 0.08) | 0.254 |
| BMI z-scores\*\* | N=321 | -0.09 (1.87) | N=313 | 0.01 (1.78) | -0.14 (-0.42 to 0.15) | 0.346 |
| Weight for length z-scores\*\*  | N=314 | -0.08 (1.79) | N=324 | 0.08 (1.63) | -0.20 (-0.46 to 0.07) | 0.147 |
| Abdominal circumference (cm) | N=329 | 43.74 (4.73) | N=347 | 43.72 (6.27) | 0.01 (-0.82 to 0.85) | 0.976 |
| Arm circumference (cm) | N=329 | 15.30 (1.49) | N=347 | 15.39 (2.08) | -0.10 (-0.39 to 0.19) | 0.503 |
| Crown length (cm) | N=186 | 45.16 (2.89) | N=195  | 45.14 (3.06) | 0.04 (-0.57 to 0.65) | 0.907 |
| Occiptofrontal circumference (cm) | N=327 | 43.69 (3.48) | N=343 | 43.81 (4.21) | -0.14 (-0.70 to 0.41) | 0.610 |

**Supplementary Table 3:** Sensitivity analysis for infant outcomes adjusting for maternal smoking to determine the influence of the UPBEAT intervention on infant anthropometry at 6 months.

\*Treatment effect adjusted for minimisation variables of randomisation (maternal BMI, ethnicity and parity), infant age at 6 month follow up and infant sex and maternal smoking status at 15-18+6 weeks’ gestation

\*\*Z-scores calculated using WHO Anthro; version 3.2.2. (de Onis et al) (3) .

‡ Infant total body fat estimation calculated using sex-specific equations with two skin fold measurements as published by Slaughter et al (1988)(4). For male infants, total body fat estimation was calculated= 1.21(∑ infant sum of skin folds)-0.008 (∑ infant sum of skin folds)-1.7. For female infants, total body fat estimation was calculated= 1.33 (∑ infant sum of skin folds)-0.013 (∑ infant sum of skin folds)-2.5.

**Supplementary Table 4:** Multiple imputation to increase precision of treatment estimates of the effect of the UPBEAT Intervention on infant anthropometry at 6 months.

Multiple imputation methodology

Data was imputed to create 50 datasets using 10 burn-in iterations for live-born infants using maternal trial entry BMI, age, ethnicity, parity, early pregnancy smoking status, randomisation allocation, measures of maternal anthropometry including GWG, maternal diet at 27-28+6 weeks’ and 6 months postpartum (glycaemic load, glycaemic index, saturated fat, carbohydrate, protein, energy intake), maternal physical activity at 27-28+6 weeks’ and 6 months post-partum (MET), gestation at delivery, infant sex, age at follow-up, mode and duration of early feeding, sleep, child health, duration of hospital admissions.

Analyses were performed by intention to treat. Treatment effects were estimated on pooled datasets using risk ratio (binary outcomes) and mean difference (continuous outcomes) adjusted for minimisation variables (Maternal BMI, parity and ethnicity) infant sex and age at follow-up visit.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  Observations  | Missing data  | % missing data | Effect size using MI\*  | P-value |
| Subscapular skinfold thickness (mm) | 548 | 972 | 63.95 | -0.29(-0.63 to -0.06) | 0.042 |
| Triceps skinfold thickness (mm) | 627 | 893 | 58.75 | -0.10 (-0.52 to 0.32) | 0.613 |
| Sum of skinfolds thickness (mm) | 547 | 973 | 64.01 | -0.63 (-1.31 to 0.06) | 0.057 |
| Total body fat estimation (%) | 547 | 973 | 64.01 | -0.79 (-1.66 to 0.72) | 0.069 |
| Weight (kg) | 677 | 843 | 55.46 | -0.08 (-0.20 to 0.04) | 0.177 |
| Height (cm) | 659 | 861 | 56.64 | 0.83 (-0.45 to 2.12) | 0.193 |
| Weight z-scores  | 643 | 877 | 57.70 | -0.09 (-0.27 to 0.09) | 0.308 |
| Length z-scores  | 622 | 898 | 59.08 | -0.16 (-0.45 to 0.42) | 0.933 |
| BMI z-scores  | 622 | 898 | 59.08 | -0.11 (-0.49 to 0.28) | 0.547 |
| Weight for length z-scores  | 638 | 882 | 58.03 | -0.13 (-0.46 to 0.20) | 0.399 |
| Abdominal circumference (cm) | 676 | 844 | 55.53 | -0.01 (-0.87 to 0.85) | 0.982 |
| Mid-arm circumference (cm) | 676 | 844 | 55.53 | -0.01 (-0.41 to 0.39) | 0.949 |
| Crown-rump length (cm) | 381 | 1139 | 74.93 | 0.08 (-0.92 to 1.09) | 0.841 |
| Occiptofrontal circumference (cm)  | 670 | 850 | 55.92 | -0.02 (-0.52 to 0.49) | 0.950 |

Abbreviations: MI- Multiple imputation

\*Treatment effects adjusted for maternal parity, BMI and ethnicity (minimisation variables) infant sex and age at follow-up.

**Supplementary Table 5**: Sensitivity analysis for departure from MAR for infant subscapular skinfold thickness using *rctmiss*(2).

|  |  |  |
| --- | --- | --- |
| δ | Difference  | Standard error |
| 0.5 | -0.38 | 0.16 |
| 0.75 | -0.38 | 0.16 |
| 1 | -0.37 | 0.16 |
| 1.5 | -0.36 | 0.17 |
| 2 | -0.35 | 0.17 |

**Supplementary Table 6:** Sensitivity analysis for departure from MAR for infant triceps skinfold thickness using *rctmiss* (2).

|  |  |  |
| --- | --- | --- |
| δ | Difference  | Standard error |
| 0.5 | -0.16 | 0.21 |
| 0.75 | -0.15 | 0.22 |
| 1 | -0.15 | 0.22 |
| 1.5 | -0.14 | 0.22 |
| 2 | -0.13 | 0.23 |

**Supplementary Table 7:** Postnatal characteristics previously associated with offspring adiposity according to randomisation allocation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Intervention (n=) | Control (n=) | Diff/ Risk ratio\* | p-value |
| Mean (SD)/N(%) | Mean (SD)/N(%) |
| Infant feeding at 6 months |
| Breast milk only | N=336 | 9 (2.7) | N=347  | 10 (2.9) | 1.01 (0.42 to 2.43) | 0.982 |
| Mixed feeding | N=336 | 55 (16.4) | N=347 | 62 (17.9) | 0.97 (0.70 to 1.33) | 0.830 |
| Breast milk &solids | N=336 | 57 (17.0) | N=347 | 61 (17.6) | 0.98 (0.71 to 1.36) | 0.917 |
| Formula & solids | N=336 | 193 (57.4) | N=347 | 193 (55.6) | 1.05 (0.93 to 1.19) | 0.400 |
| Formula only  | N=336 | 22 (6.5) | N=347 | 21 (6.1) | 1.09 (0.62 to 1.95) | 0.759 |
| Total number of days exclusively breast fed | N=260 | 80.57 (65.11) | N=243 | 85.04 (65.60) | -4.81 (-16.18 to 6.57) | 0.407 |
| Appetite and satiety \*\* |
| Enjoyment of food | N=293 | 18.54 (2.23) | N=314 | 18.40 (2.45) | 0.15 (-0.22 to 0.52) | 0.425 |
| Food responsiveness | N=342 | 11.94 (4.95) | N=350 | 12.34 (4.87) | -0.39 (-1.12 to 0.33) | 0.288 |
| General appetite  | N=342 | 3.56 (1.31) | N=350 | 3.65 (1.18) | -0.08 (-0.27 to 0.10) | 0.382 |
| Slowness in eating  | N=342 | 10.08 (2.62) | N=350 | 10.26 (2.55) | -0.18 (-0.56 to 0.20) | 0.353 |
| Satiety responsiveness | N=341 | 6.49 (2.63) | N=350 | 6.46 (2.48) | 0.02 (-0.36 to 0.40) | 0.907 |
| Childcare |
| Childcare centre | N=260 | 19 (7.3) | N=274 | 18 (6.6) | 1.05 (0.56 to 1.95) | 0.882 |
| Family Member | N=260 | 237 (91.2) | N=274 | 244 (89.1) | 1.03 (0.98 to 1.09) | 0.293 |
| Nanny | N=260 | 5 (1.9) | N=274 | 6 (2.2) | 0.90 (0.27 to 2.94) | 0.860 |
| Other | N=260 | 4 (1.5) | N=274 | 9 (3.3) | 0.44 (0.14 to 1.42) | 0.170 |
| Sleep |
| Total infant sleep (hours) | N=340 | 14.57 (11.17) | N=353 | 13.54 (9.68) | 1.04 (-0.52 to 2.60) | 0.190 |
| Child health  |
| Total inpatient nights | N=35 | 3.97 (3.63) | N=33 | 2.67 (2.07) | 2.03 (0.25 to 3.81) | 0.026 |

\*Treatment effect adjusted for minimisation variables of randomisation (maternal BMI, ethnicity and parity), infant age at 6 month follow up and infant sex.

\*\* Appetite and satiety assessed by the Baby Eating Behaviour Questionnaire (5).

**Supplementary Table 8**: Cause of infant hospital admission and medication use

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Intervention | Control | Risk ratio\* | P-value |
| N=(%) | N=(%) |  |
| Reason for hospital admission  |  |  |  |  |  |  |
| Gastrointestinal  | N=35 | 2(5.7) | N=33 | 9 (27.3) | 0.21 (0.05 to 0.92) | 0.038 |
| Viral or bacterial infection | N=35 | 15 (42.9) | N=33 | 10 (30.3) | 1.44 (0.77 to 2.71) | 0.259 |
| Weight loss | N=35 | 3 (8.6) | N=33 | 2 (6.1) | 1.47 (0.26 to 8.23) | 0.660 |
| Congenital anomaly | N=35 | 3 (8.6) | N=33 | 2 (6.1) | 1.51 (0.27 to 8.53) | 0.638 |
| Respiratory | N=35 | 7 (20.0) | N=33 | 4 (12.1) | 1.87 (0.61 to 5.73) | 0.272 |
| Hypoglycaemia | N=35 | 0 (0.0) | N=33 | 1 (3.0) | - | - |
| Other | N=35 | 5 (14.3) | N=33 | 5 (15.2) | - | 1.00 |
| Reasons for use of medications |  |  |  |  |  |  |
| Infection  | N=491 | 96 (19.6%) | N=488 | 76 (15.6) | 1.20 (0.91 to 1.57) | 0.193 |
| Other | N=491 | 147 (29.9) | N=488 | 154 (31.6) | 0.96 (0.80 to 1.16) | 0.685 |
| Pain  | N=491 | 174 (35.4) | N=488 | 182 (37.3) | 0.96 (0.82 to 1.14) | 0.669 |
| Pyrexia | N=491 | 74 (15.1) | N=488 | 76 (15.6) | 0.96 (0.71 to 1.28) | 0.759 |

\* Difference/ risk ratio adjusted for maternal pre-pregnancy BMI, parity, ethnicity and infant sex and age at follow up.

**Supplementary Table 9:** Infant anthropometry according to number of maternal health trainer sessions (HTS)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Infant  |  | ≥4 HTS |  | ≤3 HTS | Mean diff/ Risk Ratio\*  |  |
| Subscapular (mm) | N=83 | 7.74 (1.66) | N=184 | 7.46 (1.94) | 0.09 (-0.40 to 0.58) | 0.718 |
| Triceps (mm) | N=98 | 9.12 (2.63) | N=209 | 9.95 (2.78) | -0.64 (-1.31 to 0.03) | 0.063 |
| Sum of skinfolds (mm) | N=83 | 16.94 (3.92) | N=184 | 17.15 (3.94) | -0.22 (-1.32 to 0.89) | 0.701 |
| Total body fat estimation (%)‡ | N=83 | 19.35 (5.08) | N=184 | 19.42 (4.97) | -0.24 (-1.66 to 1.17) | 0.734 |
| Infant weight (kg) | N=103 | 7.71 (1.01) | N=229 | 8.02 (1.09) | -0.21 (-0.45 to 0.03) | 0.084 |
| Weight z-scores | N=102 | 0.07 (1.08) | N=219 | 0.25 (1.07) | -0.20 (-0.46 to 0.06) | 0.134 |
| Abdominal circumference (cm) | N=103 | 42.66 (6.73) | N=226 | 44.23 (3.37) | -1.53 (-3.17 to 0.12) | 0.069 |
| Arm circumference (cm) | N=103 | 15.00 (1.86) | N=226 | 15.44 (1.27) | -0.44 (-0.91 to 0.02) | 0.063 |

\*Difference/ risk ration adjusted for maternal pre-pregnancy BMI, parity, ethnicity and infant sex and age at follow up.

‡ Infant total body fat estimation calculated using sex-specific equations with two skin fold measurements as published by Slaughter et al(4). For male infants, total body fat estimation was calculated= 1.21(∑ infant sum of skin folds)-0.008 (∑ infant sum of skin folds)-1.7. For female infants, total body fat estimation was calculated= 1.33 (∑ infant sum of skin folds)-0.013 (∑ infant sum of skin folds)-2.5.

**Supplementary Table 10**: Pre-defined interaction tests by infant sex

|  |  |  |  |
| --- | --- | --- | --- |
|  | Female | Male | Wald test for interaction  |
| **Diff/ Risk Ratio\*** | **p-value** | **Diff/Risk Ratio\*** | **p-value** |  |
|
| Subscapular (mm) | -0.50 (-0.97 to -0.02) | 0.039 | -0.23 (-0.65 to 0.20) | 0.291 | 0.416 |
| Triceps (mm) | -0.19 (-0.80 to 0.42) | 0.534 | -0.26 (-0.86 to 0.34) | 0.394 | 0.867 |
| Sum of skinfolds (mm) | -0.83 (-1.83 to 0.17) | 0.103 | -0.41 (-1.30 to 0.48) | 0.365 | 0.549 |
| Total body fat estimation (%) ‡ | -1.09 (-2.41 to 0.22) | 0.103 | -0.49 (-1.56 to 0.58) | 0.365 | 0.139 |
| Infant weight (kg) | -0.13 (-0.34 to 0.08) | 0.224 | -0.07 (-0.30 to 0.16) | 0.554 | 0.720 |
| Weight z-scores\*\* | -0.14 (-0.36 to 0.08) | 0.225 | -0.06 (-0.32 to 0.20) | 0.647 | 0.632 |
| Arm circumference (cm) | -0.06 (-0.52 to 0.40) | 0.798 | -0.11 (-0.43 to 0.21) | 0.507 | 0.812 |
| Abdominal circumference (cm) | 0.30 (-0.89 to 1.49) | 0.617 | -0.33 (-1.48 to 0.82) | 0.578 | 0.350 |

\*Treatment effect adjusted maternal pre-pregnancy BMI, parity, ethnicity and infant sex and age at follow up. Differences and risk ratios are calculated by randomisation allocation.

\*\* Z-scores calculated using WHO Anthro; version 3.2.2 (3).

‡ Infant total body fat estimation calculated using sex-specific equations with two skin fold measurements as published by Slaughter et al (4). For male infants, total body fat estimation was calculated= 1.21(∑ infant sum of skin folds)-0.008 (∑ infant sum of skin folds)-1.7. For female infants, total body fat estimation was calculated= 1.33 (∑ infant sum of skin folds)-0.013 (∑ infant sum of skin folds)-2.5.

**Supplementary Table 11:** Pre-defined interaction tests by infant feeding defined as breastfeeding ≥3 months.

|  |  |  |  |
| --- | --- | --- | --- |
|  | <3months breastfeeding | ≥ 3 months breastfeeding | Wald test for interaction |
| **Diff/ Risk Ratio\*** | **p-value** | **Diff/ Risk Ratio\*** | **p-value** |
|  |
| Subscapular (mm) | -0.27 (-0.66 to 0.12) | 0.181 | -0.54 (-1.10 to 0.02) | 0.060 | 0.438 |
| Triceps (mm) | 0.148 (-0.36 to 0.71) | 0.520 | -0.90 (-1.59 to -0.21) | 0.011 | 0.016 |
| Sum of skinfolds (mm) | -0.18 (-1.02 to 0.67) | 0.684 | -1.42 (-2.52 to -0.32) | 0.012 | 0.087 |
| Total body fat estimation (%) ‡ | -0.23 (-1.30 to 0.85) | 0.677 | -1.81 (-3.20 to -0.42) | 0.011 | 0.085 |
| Infant weight (kg) | -0.05 (-0.24 to 0.14) | 0.582 | -0.16 (-0.42 to 0.10) | 0.240 | 0.584 |
| Weight z-scores\*\* | -0.04 (-0.24 to 0.17) | 0.730 | -0.18 (-0.48 to 0.11) | 0.225 | 0.486 |
| Abdominal circumference (cm) | 0.05 (-0.85 to 0.96) | 0.909 | 0.12 (-1.51 to 1.75) | 0.889 | 0.970 |
| Arm circumference (cm) | 0.11 (-0.24 to 0.45) | 0.539 | -0.36 (-0.74 to 0.03) | 0.068 | 0.078 |

\*Treatment effect adjusted for maternal pre-pregnancy BMI, parity, ethnicity and infant sex and age at follow up. Presented differences and risk ratio are calculated by treatment allocation.

\*\* Z-scores calculated using WHO Anthro; version 3.2.2 (3).

‡ Infant total body fat estimation calculated using sex-specific equations with two skin fold measurements as published by Slaughter et al (4). For male infants, total body fat estimation was calculated= 1.21(∑ infant sum of skin folds)-0.008 (∑ infant sum of skin folds)-1.7. For female infants, total body fat estimation was calculated= 1.33 (∑ infant sum of skin folds)-0.013 (∑ infant sum of skin folds)-2.5.

**Supplementary Figure 1:** Casual mediation analysis assessing the influence of change in maternal dietary intake and gestational weight gain at 27-28+6 weeks’ is mediated on the observed difference in infant subscapular skinfold thickness(6).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Effect  | b | 95% CI  | p-value  |
| *Maternal anthropometry* |  |
| Early GWG\* |  |  |  |  |
|  | Direct effect  | -0.41 | -0.73 to -0.09 | 0.015 |
|  | Indirect effect  | -0.00 | -0.04 to 0.04 | 0.951 |
|  | Total effect  | -0.41 | -0.73 to -0.08 | 0.014 |
| Late GWG\* \* |  |  |  |  |
|  | Direct effect  | -0.45 | -0.78 to -0.12 | 0.008 |
|  | Indirect effect  | -0.00 | -0.01 to 0.01 | 0.732 |
|  | Total effect  | -0.45 | -0.79 to -0.12 | 0.008 |
| Total GWG  |  |  |  |  |
|   | Direct effect  | -0.44 | -0.78 to -0.11 | 0.010 |
|  | Indirect effect  | -0.00 | -0.04 to 0.36 | 0.933 |
|  | Total effect  | -0.44 | -0.78 to -0.11 | 0.009 |
| *Maternal diet*  |  |  |  |  |
| Glycaemic load at 27-28+6 weeks’ |  |
|  | Direct effect  | -0.31 | -0.65 to 0.04 | 0.079 |
|  | Indirect effect | -0.09 | -0.20 to 0.02 | 0.101 |
|  | Total effect  | -0.40 | -0.72 to -0.07 | 0.017 |
| Saturated fat at 27-28+6 weeks’ (%E) |  |
|  | Direct effect | -0.38 | -0.72 to -0.04 | 0.028 |
|  | Indirect effect | -0.02 | -0.11 to 0.07 | 0.695 |
|  | Total effect  | -0.40 | -0.73 to -0.07 | 0.016 |
| Energy intake at 27-28+6 weeks’ (kcal) |  |
|  | Direct effect  | -0.34 | -0.68 to -0.01 | 0.045 |
|  | Indirect effect  | -0.05 | -0.14 to 0.03 | 0.224 |
|  | Total effect  | -0.40 | -0.72 to -0.72 | 0.017 |

\* Early GWG defined as maternal weight objectively measured at 27-28+6 weeks’ gestation subtracted from weight at trial entry (15-18+6 weeks’ gestation).

\*\*Late GWG defined as maternal weight objectively measured at 34-36 weeks’ gestation subtracted from maternal weight at 27-28+6 weeks’. Casual mediation analysis was performed for late gestational weight gain, independent of early GWG.

Abbreviations; GL- Glycaemic load, GWG- Gestational weight gain, MET-Metabolic equivalent of task

**Supplementary Figure 2:** Casual mediation analysis assessing the effect of change in maternal diet at 6 months post-partum mediated on infant subscapular skin folds(7).



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Effect  | b | 95% CI  | p-value  |
| Maternal Glycaemic load at 6 months \* |  |
|  | Direct effect  | -0.59 | -1.29 to 0.11 | 0.100 |
|  | Indirect effect  | 0.00 | -2.80 to 0.00 | 0.570 |
|  | Total effect  | -0.59 | -1.29 to 0.11 | 0.100 |
| Maternal Saturated fat at 6 months \* |  |
|  | Direct effect  | -0.42 | -1.11 to 0.27 | 0.230 |
|  | Indirect effect  | - | - | - |
|  | Total effect  | -0.42 | -1.11 to 0.27 | 0.230 |
| Maternal energy intake at 6 months \* |  |
|  | Direct effect  | -0.62 | -1.30 to 0.05 | 0.076 |
|  | Indirect effect  | 0.015 | -0.005 to 0.007 | 0.623 |
|  | Total effect  | -0.62 | -1.30 to 0.06 | 0.076 |

\*Casual mediation analyses undertaken for maternal 6-month postpartum dietary intake independent of antenatal (27-28+6 weeks’) dietary intake.

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