****

**Supplementary Fig S1** **CONSORT diagram of the study for the mood assessments during pregnancy and at postnatal.** The upper limit of BMI is 60 kg/m2.



**Supplementary Fig. S2** **Participants were more satisfied with life following pregnancy and delivery.** The bottom and top line of the bar represents minimum and maximum SWLS score, respectively. \* P≤0.05. SO: Severely Obese.

**Supplementary Table S1 The poorer mood outcome in SO group was still observed in z-score format**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mood assessments, mean (SD)** | | **Lean** | **SO** | **p** |
| **Week 17 (visit 1)** | **zAnx** | -0.26 (0.81) | 0.16 (0.94) | ***0.002*** |
| **zDep** | -0.40 (0.72) | 0.24 (0.96) | ***≤ 0.0001*** |
| **Week 28 (visit 2)** | **zAnx** | -0.29 (0.72) | 0.18 (0.98) | ***≤ 0.0001*** |
| **zDep** | -0.42 (0.63) | 0.25 (0.99) | ***≤ 0.0001*** |
| **postpartum** | **zAnx** | -0.25 (0.85) | 0.15 0.96) | ***0.012*** |
| **zDep** | -0.39 (0.73) | 0.23 (0.94) | ***≤ 0.0001*** |

SO: Severely Obese. **z**Anx: averaged z-scores of anxiety outcomes, zDep: averaged z-scores of depression outcomes. P values = student’s t-tests

**Supplementary Table S2 No significant difference was found between mood symptoms dataset before and after missing data imputation**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Mood assessments, mean (SD)** | | **Lean** | | | **SO** | | |
| **Before** | **After** | **p** | **Before** | **After** | **p** |
| **Week 17 (visit 1)** | **zAnx** | -0.26 (0.81) | -0.20 (0.79) | 0.53 | 0.16 (0.94) | 0.15 (0.98) | 0.93 |
| **zDep** | -0.40 (0.72) | -0.33 (0.69) | 0.42 | 0.24 (0.96) | 0.24 (1.02) | 0.99 |
| **Week 28 (visit 2)** | **zAnx** | -0.29 (0.72) | -0.24 (0.72) | 0.62 | 0.18 (0.98) | 0.19 (1.02) | 0.86 |
| **zDep** | -0.42 (0.63) | -0.37 (0.59) | 0.53 | 0.25 (0.99) | 0.28 (1.07) | 0.81 |
| **postpartum** | **zAnx** | -0.25 (0.85) | -0.22 (0.77) | 0.8 | 0.15 0.96) | 0.17 (1.01) | 0.9 |
| **zDep** | -0.39 (0.73) | -0.30 (0.62) | 0.41 | 0.23 (0.94) | 0.32 (1.08) | 0.51 |

SO: Severely Obese. **z**Anx: averaged z-scores of anxiety outcomes, zDep: averaged z-scores of depression outcomes. “Before” and “After”: Before and after MCMC-missing data imputation was applied, respectively. P values = student’s t-tests.

**Supplementary Table S3 Mood assessment cut-off scores of research participants throughout pregnancy**.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Mood assessments | Lean | SO | P1 | P2 | P3 | P4 |
| Satisfaction with Life Scale score ≤19, slightly below average (41) | | | | | | |
| visit1, n (%) | 10 (8.2) | 38 (22.89) | ***0.001*** | ***0.015*** | ***0.002*** | 0.008 |
| visit2, n (%) | 5 (4.2) | 30 (17.75) | ***≤ 0.0001*** | ***0.032*** | ***0.025*** | ***0.039*** |
| Postnatal, n (%) | 2 (2.78) | 6 (9.09) | 0.152 | 0.075 | 0.095 | 0.925 |
| Hospital Anxiety Depression Scale score ≥10 (38) | | | | | | |
| *Anxiety* |  |  |  |  |  |  |
| visit1, n (%) | 10 (8.2) | 24 (14.63) | 0.139 | 0.44 | 0.242 | 0.202 |
| visit2, n (%) | 7 (6.25) | 30 (17.86) | ***0.004*** | 0.303 | ***0.028*** | 0.456 |
| Postnatal, n (%) | 3 (4.17) | 13 (18.57) | ***0.008*** | 0.659 | ***0.012*** | 0.49 |
| *Depression* |  |  |  |  |  |  |
| visit1, n (%) | 2 (1.64) | 10 (6.14) | 0.076 | 0.887 | 0.238 | 0.684 |
| visit2, n (%) | 1 (0.84) | 9 (5.36) | ***0.05*** | 0.535 | 0.678 | 0.884 |
| Postnatal, n (%) | 0 (0) | 4 (5.8) | 0.055 | 0.165 | 0.13 | 0.978 |
| State Trait Anxiety Index score ≥39, from validation study of female population (39) | | | | | | |
| *State* |  |  |  |  |  |  |
| visit1, n (%) | 13 (10.83) | 45 (27.78) | ***0.001*** | ***0.023*** | ***0.005*** | ***0.033*** |
| visit2, n (%) | 15 (12.6) | 46 (27.87) | ***0.002*** | ***0.044*** | ***0.013*** | ***0.053*** |
| Postnatal, n (%) | 9 (13) | 20 (25.97) | 0.062 | 0.118 | ***0.002*** | ***0.017*** |
| *Trait* |  |  |  |  |  |  |
| visit1, n (%) | 25 (21) | 54 (33.13) | ***0.031*** | 0.096 | 0.093 | 0.058 |
| visit2, n (%) | 24 (20.5) | 59 (35.75) | ***0.008*** | 0.428 | ***0.027*** | 0.399 |
| Postnatal, n (%) | 11 (16.18) | 22 (28.57) | 0.112 | ***0.033*** | ***0.029*** | 0.075 |
| General Health Questionnaire score ≥3, a suggested cut-off for further screening (42) | | | | | | |
| visit1, n (%) | 23 (18.7) | 87 (53.05) | ***≤ 0.0001*** | ***≤ 0.0001*** | ***≤ 0.0001*** | ***≤ 0.0001*** |
| visit2, n (%) | 32 (26.89) | 85 (50.3) | ***≤ 0.0001*** | ***0.002*** | ***0.003*** | ***0.006*** |
| Postnatal, n (%) | 12 (17.14) | 34 (50) | ***≤ 0.0001*** | ***0.007*** | ***≤ 0.0001*** | ***0.023*** |

P1 was obtained from Fisher’s Exact Test. Logistic regression was used to obtain P2 P3 and P4. SO: Severely Obese. OR: Odd Ratio, CI: Confidence Interval Bold-Italic texts are significant at 0.05 levels, underlined text are significant at 0.1 levels. The cut-off scores are recommended scores for further clinical diagnosis.

1 unadjusted

2 adjusted for maternal factors **prior to** current pregnancy: age, smoking status, alcohol consumption (unit/week), parity, deprivation category

3 adjusted for maternal factors arising **during** pregnancy: minor complications, GDM, risks of sleep apnoea, differences of gestational visit time between lean and obese groups at visit 1 and postnatal

4 adjusted for factors in P2 and P3,

**Supplementary Table S4 Differences in mood scores during pregnancy between mothers who attended for follow-up and those who did not.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mood Assessments** | | **Attended postnatal follow-up** | | | **Declined postnatal follow-up** | | | **p value (t-test)** | | |
| **Lean** | **SO** | **All** | **Lean** | **SO** | **All** | **Lean** | **SO** | **All** |
| **visit 1** | **SWLS** | 28.05 (5.45) | 24.94 (5.95) | 26.34 (5.92) | 27.73 (1.31) | 22.76 (7.05) | 24.47 (7.11) | 0.806 | *0.055* | *0.036* |
| **HA** | 5.05 (2.65) | 5.64 (3.44) | 5.38 (3.12) | 5.73 (0.71) | 6.33 (3.56) | 6.11 (3.46) | 0.307 | 0.283 | 0.112 |
| **HD** | 1.91 (1.87) | 3.52 (3.22) | 2.8 (2.81) | 3.27 (0.61) | 4.25 (3.35) | 3.9 (3.20) | *0.007* | 0.223 | *0.009* |
| **State** | 28.15 (7.69) | 33.07 (10.50) | 30.86 (9.64) | 31.77 (2.45) | 35.86 (10.48) | 34.45 (10.93) | 0.076 | 0.143 | *0.012* |
| **Trait** | 32.45 (8.78) | 35.52 (11.22) | 34.15 (10.29) | 34.09 (2.24) | 39.17 (12.51) | 37.48 (11.98) | 0.455 | 0.083 | *0.032* |
| **GHQ** | 1.5 (1.77) | 2.97 (2.71) | 2.31 (2.44) | 2.27 (0.55) | 3.95 (2.86) | 3.37 (2.86) | 0.097 | *0.050* | *0.004* |
| **visit 2** | **SWLS** | 28.64 (4.53) | 25.64 (5.14) | 26.99 (5.09) | 30 (0.99) | 23.19 (6.14) | 25.27 (6.44) | 0.232 | *0.012* | *0.028* |
| **HA** | 5 (2.71) | 5.76 (3.34) | 5.42 (3.09) | 5 (0.62) | 6.58 (3.89) | 6.1 (3.62) | 1.000 | 0.191 | 0.144 |
| **HD** | 2.01 (1.81) | 3.28 (2.66) | 2.7 (2.39) | 2.26 (0.32) | 5.63 (3.68) | 4.6 (3.52) | 0.567 | *0.000* | *0.000* |
| **State** | 28.59 (8.00) | 32.86 (9.70) | 30.93 (9.20) | 29.47 (1.63) | 37.53 (11.62) | 34.93 (10.99) | 0.656 | *0.013* | *0.005* |
| **Trait** | 32.18 (8.08) | 35.20 (10.88) | 33.85 (9.82) | 33.17 (1.59) | 39.7 (12.37) | 37.67 (11.28) | 0.629 | *0.030* | *0.011* |
| **GHQ** | 1.68 (1.83) | 3.05 (2.64) | 2.44 (2.41) | 2.16 (0.38) | 4.19 (3.59) | 3.56 (3.25) | 0.295 | *0.030* | *0.003* |

Mothers who attended postnatal follow-up reported less mood symptoms during pregnancyas compared to those who did not.SO: Severely Obese, Bold-Italic texts are significant at 0.05 levels. Displayed values are mean (SD).

**Supplementary Table S5 Increased maternal** **anxiety and depression symptoms in week 17 pregnancy were correlated with increased** **postpartum weight retention** in Severely Obese (SO) group, but not in the controls.

|  |  |  |  |
| --- | --- | --- | --- |
| Postnatal weight loss, Pearson's R (p) | | Lean | SO |
| Week 17 pregnancy | (z) Anxiety symptoms | 0.07 | **-0.24\*\*** |
| (z) Depression symptoms | 0.06 | **-0.22\*** |

Postpartum weight retention = - (Postnatal weight loss), \*\* p≤ 0.01, \*p ≤ 0.05.