

Association of maternal wellbeing in pregnancy and offspring adiposity at 5 years – findings from the ROLO longitudinal birth cohort study

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Background

Emerging data suggests that maternal mental and emotional health during pregnancy may influence the offspring's risk of excess childhood adiposity.

We aimed to:

- Determine the relationship between maternal wellbeing in pregnancy and offspring adiposity at 5 years.

Methodology

Mother and child pairs (n = 338) participating in the ROLO study, a longitudinal birth cohort, had assessments performed at birth and 5-years follow-up; demographics can be seen in Table 1.

- Assessments included anthropometry and skinfold measurements.
- Infant and child body composition was assessed by circumferences such as head, neck, mid upper arm (MUA), chest, abdomen, hip, and thigh. Skinfold measurements included biceps, triceps, subscapular and thigh.
- The **WHO-5 wellbeing index (Fig. 1)** was used to measure well-being (mid-pregnancy assessment only).
- Scores were classified as high (>50%), moderate (28-50%), or low (<28%).
- Data were analysed using Independent sample t-tests, Pearson's correlations, analysis of variance (ANOVA) and multiple linear regression.
- Confounders included in regression analysis were:
 - Child age at 5-year follow-up, membership of intervention group, child sex, maternal BMI at 5-year follow-up, infant feeding, maternal education, and birthweight.

Figure 1. The WHO-5 Well-being Scale. Instructions, Questions, and Scoring principle.

The WHO-5 questionnaire						
Instructions: Please indicate for each of the 5 statements which is closest to how you have been feeling over the past 2 weeks.						
Over the past 2 weeks...	All of the time	Most of the time	More than half the time	Less than half the time	Some of the time	At no time
1 ... I have felt cheerful and in good spirits	5	4	3	2	1	0
2 ... I have felt calm and relaxed	5	4	3	2	1	0
3 ... I have felt active and vigorous	5	4	3	2	1	0
4 ... I woke up feeling fresh and rested	5	4	3	2	1	0
5 ... my daily life has been filled with things that interest me	5	4	3	2	1	0

Scoring principle: The raw score ranging from 0 to 25 is multiplied by 4 to give the final score from 0 representing the worst imaginable well-being to 100 representing the best imaginable well-being.

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Results

Table 1. Maternal, infant, and child characteristics of the ROLO pregnancy & 5-year follow-up

Maternal Characteristics	n	Value
Maternal age at delivery (years)	338	33.13 (3.92)
Study group (n, % intervention)	338	173 (51.2)
Smoking (n, % current)	338	9 (2.7)
Ethnicity (n, % White Irish)	338	304 (89.9)
Education attainment (n, % complete third level)	338	208 (61.5)
Body Mass Index (kg/m ²)*	337	26.03 (23.08, 27.93)
BMI category (n, % obesity)	337	58 (17.2)
Maternal well-being (%)	338	58.46 (15.16)
Low maternal well-being (n, % <50)	338	89 (26.3)
Extremely low well-being (n, % <28)	338	11 (3.3)
Gestational Weight Gain per week 38 (kg)	280	0.50 (0.157)
Socioeconomic Advantaged (n, % advantaged) †	338	242 (71.6)
Infant Characteristics		
Infant sex (n, % male)	336	169 (50.0)
Birth weight (g)	338	4048.40 (445.52)
Macrosomia (n, % >4,000g)	338	187 (55.3)
Child Characteristics		
Weight (kg) * ‡	338	20.36 (18.4, 22.0)
Length (cm) ‡	337	111.75 (4.6)
BMI (kg/m ²) ‡	337	16.25 (1.36)
BMI SDS normal weight (n, % NW)	337	252 (74.6)
BMI SDS overweight (n, % overweight)	337	69 (20.4)
BMI SDS obesity (n, % obesity)	337	16 (4.7)

Continuous data are presented as mean ± standard deviation, unless * which is median (interquartile range). Categorical variables are presented as numbers (%). † = socioeconomic status was measured through the HP index. ‡ = standard deviation scores (SDS) were calculated for these variables according to the WHO-growth standards. BMI = Body Mass Index; NW = Normal Weight; MUA = Mid-Upper Arm

- Mean android-gynoid ratio** was significantly different in children of mothers with low wellbeing compared with mothers who had high wellbeing (0.34 (0.07) vs. 0.27 (0.06), $p = 0.014$).
- Children born to mothers of moderate wellbeing had increased **child thigh circumference** compared to mothers of high wellbeing (33.30mm (2.86) vs. 32.59mm (2.9), $p = 0.049$).
- In adjusted analysis, an inverse association was observed between maternal wellbeing and child's thigh circumference ($B = -0.155$, 95% CI = -0.049, -0.009, $p = 0.004$).

Conclusion

Lower maternal wellbeing may be associated with increased offspring adiposity in children. Further investigation is needed to confirm these findings and the potential mechanisms underlying this relationship