

Longitudinal assessment of maternal anthropometric measurements in obese pregnant women; association with gestational diabetes and treatment.

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- **Maternal body composition and gestational weight gain** provide insight into the physiology of pregnancy and the pathophysiology of offspring adiposity.
- **Maternal obesity predisposes to gestational diabetes mellitus (GDM) and adverse pregnancy outcomes**
- **Different metabolic patterns in GDM may influence body composition and weight gain**
 - In normal pregnancy, an initial anabolic phase is followed by a catabolic phase (Soltani et al, 2000).
 - In GDM, there is prolonged anabolic phase
- Currently, there is limited understanding of the influence of GWG on GDM and pregnancy outcomes.
- Data used is taken from the **UPBEAT study** which considered the effects of antenatal behavioural lifestyle intervention in obese mothers.

- **To investigate gestational weight gain and maternal measures of fat mass during pregnancy and 6 months postpartum in obese pregnant women with and without GDM.**
- **To investigate the influence of GDM treatment on patterns of weight gain and adipose tissue accretion to the postpartum period.**

Study design: Longitudinal cohort analysis using early pregnancy data to 6 months postpartum from the UPBEAT randomised controlled trial (obese women).

Outcomes: Maternal anthropometric measurements (eg weight, mid arm & thigh circumference & all skin folds).

Exposures: GDM diagnosis (binary; GDM vs. no-GDM)

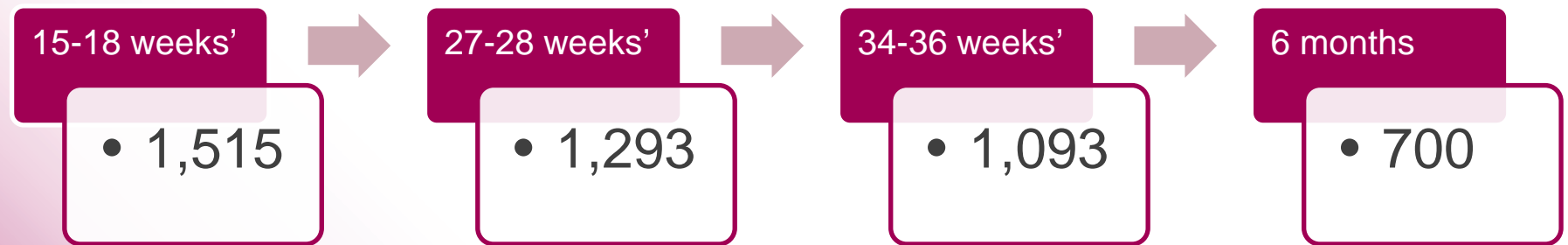
Confounders: parity (nullip vs. multip), socioeconomic status (most deprived [classes 4 & 5] vs. least deprived [classes 1-3]), ethnicity, and maternal age

Statistical modelling: mixed methods modelling for repeated measurements

Effect modification: Treatment for GDM

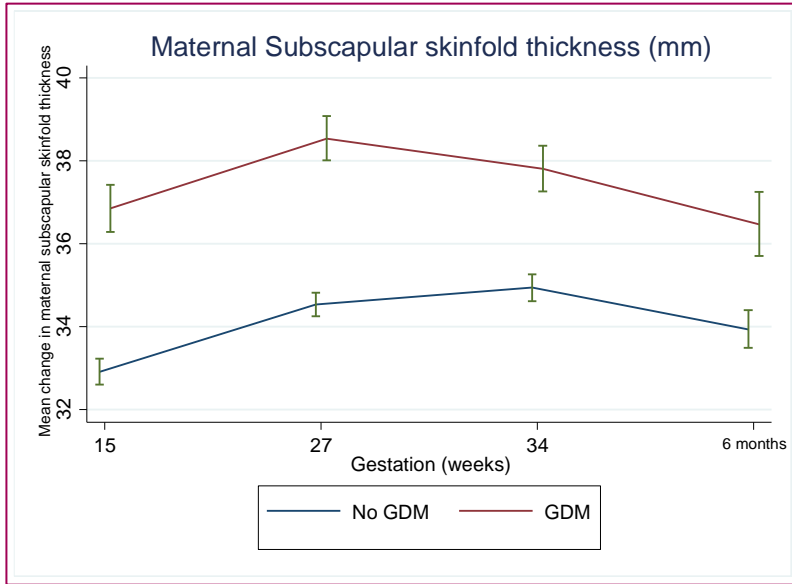
Results: Demographic characteristics

- Maternal age: 30.46 years (SD 5.50)
- Median BMI: 36.30 kg/m² (IQR 4.77)
- 54.9% multiparous
- 75% in highest quintile of socio-economic deprivation
- 27.8% GDM (IADPSG criteria).

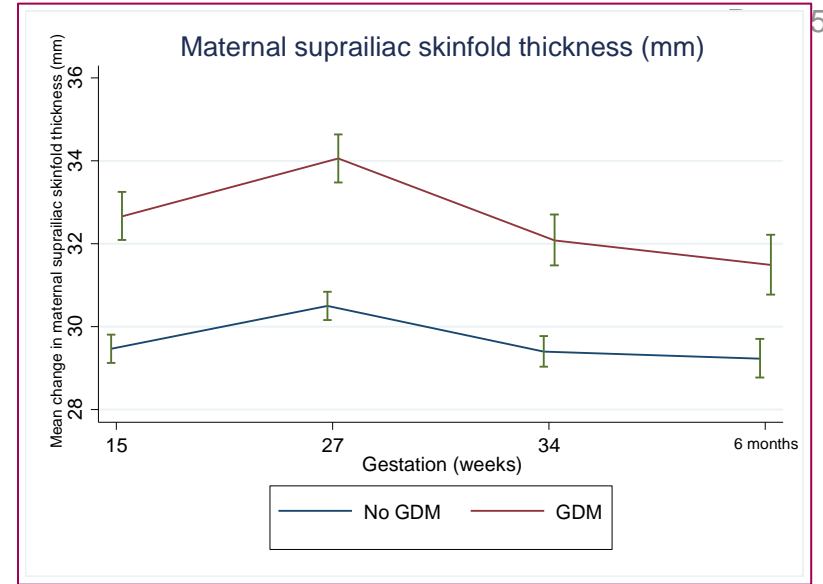


>4000 observations contributed to the statistical model

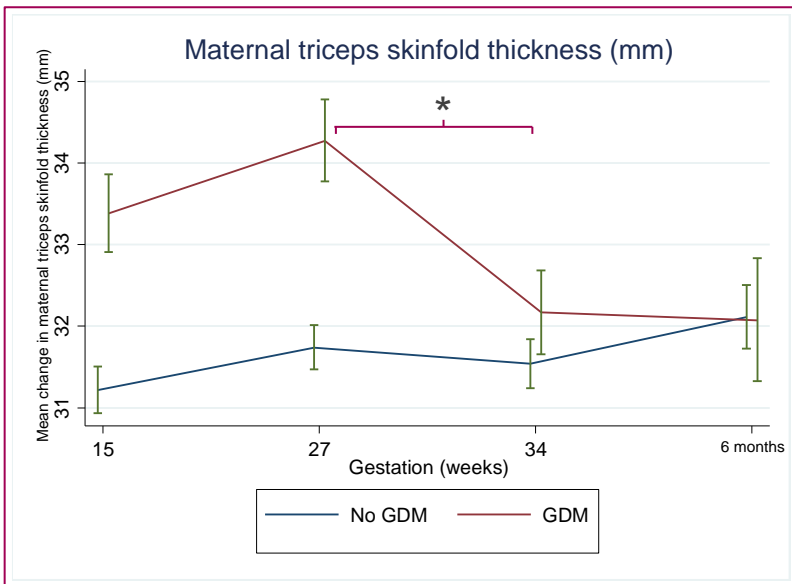
Subscapular SFT: GDM vs No GDM



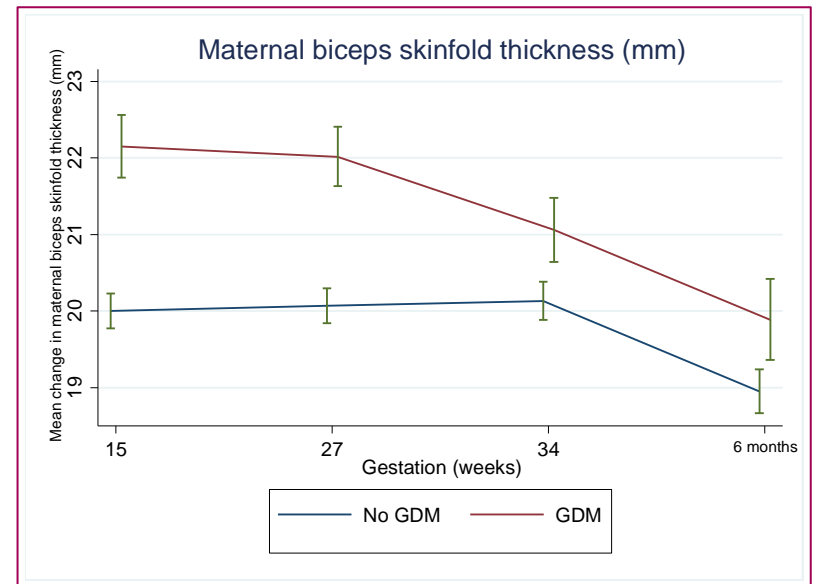
Suprailiac SFT: GDM vs No GDM



Triceps SFT: GDM vs No GDM

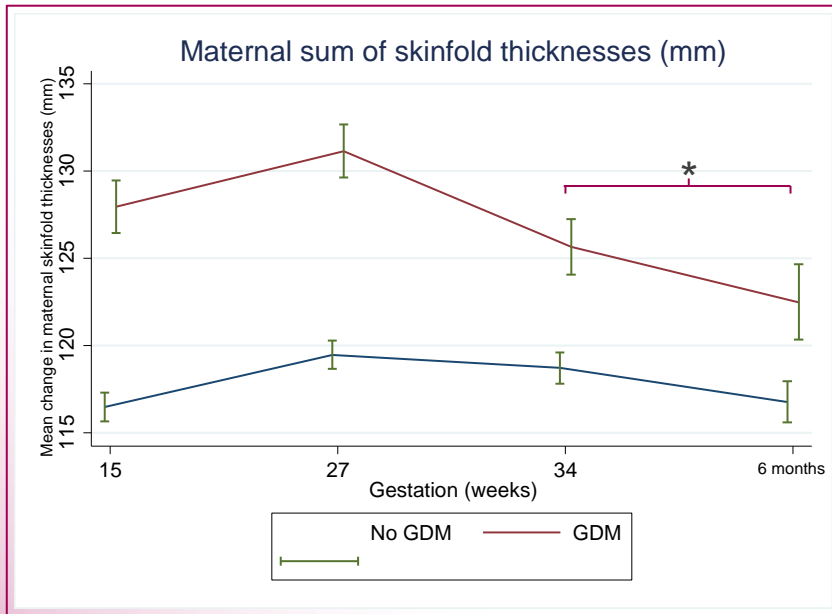


Biceps SFT: GDM vs No GDM

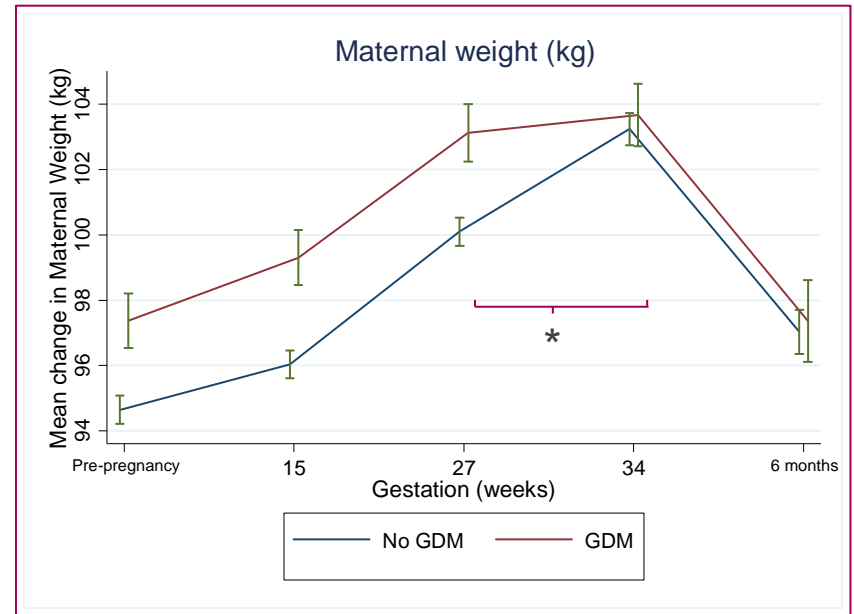


Sum of Skin Folds and Maternal Weight in Obese Pregnant Women

Sum of skinfolds: GDM vs No GDM

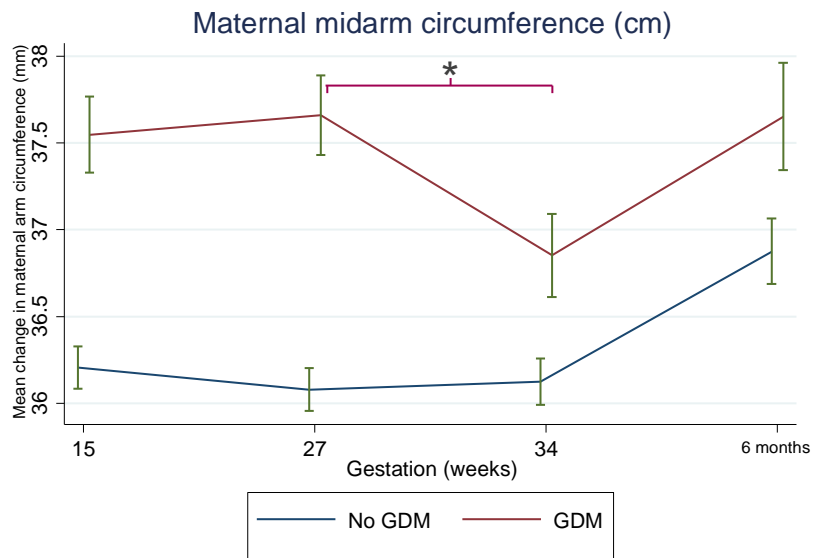


Maternal Weight: GDM vs No GDM

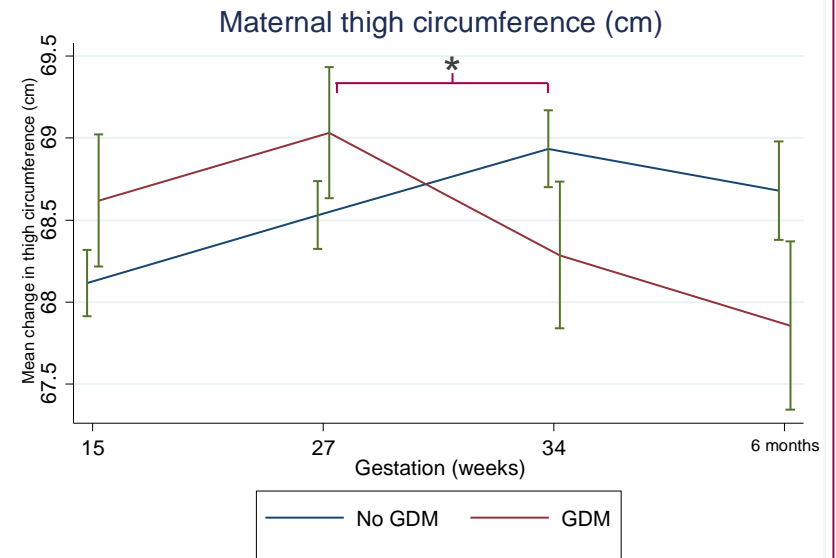


Mid-arm and Thigh circumferences in obese pregnant women

Maternal Mid-arm circumference: GDM vs No GDM



Maternal thigh circumference: GDM vs No GDM



Rate of change in skinfold thicknesses in obese pregnant women following with and without GDM.

27-28⁺⁶ weeks to 34-36 weeks' gestation

	Difference in rate of change (mm/week)	Adjusted†	
		95% CI	P-value
SSF	-1.02	-4.09 – 2.95	0.926
Subscapular	-0.68	-2.37 – 0.51	0.354
Suprailiac	-0.26	-1.90 – 1.26	0.747
Triceps	-0.12	-1.32 – 0.90	0.000
Biceps	0.06	-1.01 – 1.23	0.910

† Values are adjusted for Maternal Age, BMI, parity, ethnicity and socioeconomic status.

Rate of change in maternal anthropometry in obese pregnant women with and without GDM.

34-36 weeks to 6 months postpartum.

		Adjusted†	
	Difference in rate of change (per week)	95% CI	P-value
Weight (kg)	-1.84 kg	-6.07- -4.73	0.000
Mid-arm (cm)	-0.67 cm	-5.08 - -4.54	0.009
Thigh (cm)	-0.77 cm	-3.10 - -1.90	0.013

† Values are adjusted for Maternal Age, BMI, parity, ethnicity and socioeconomic status

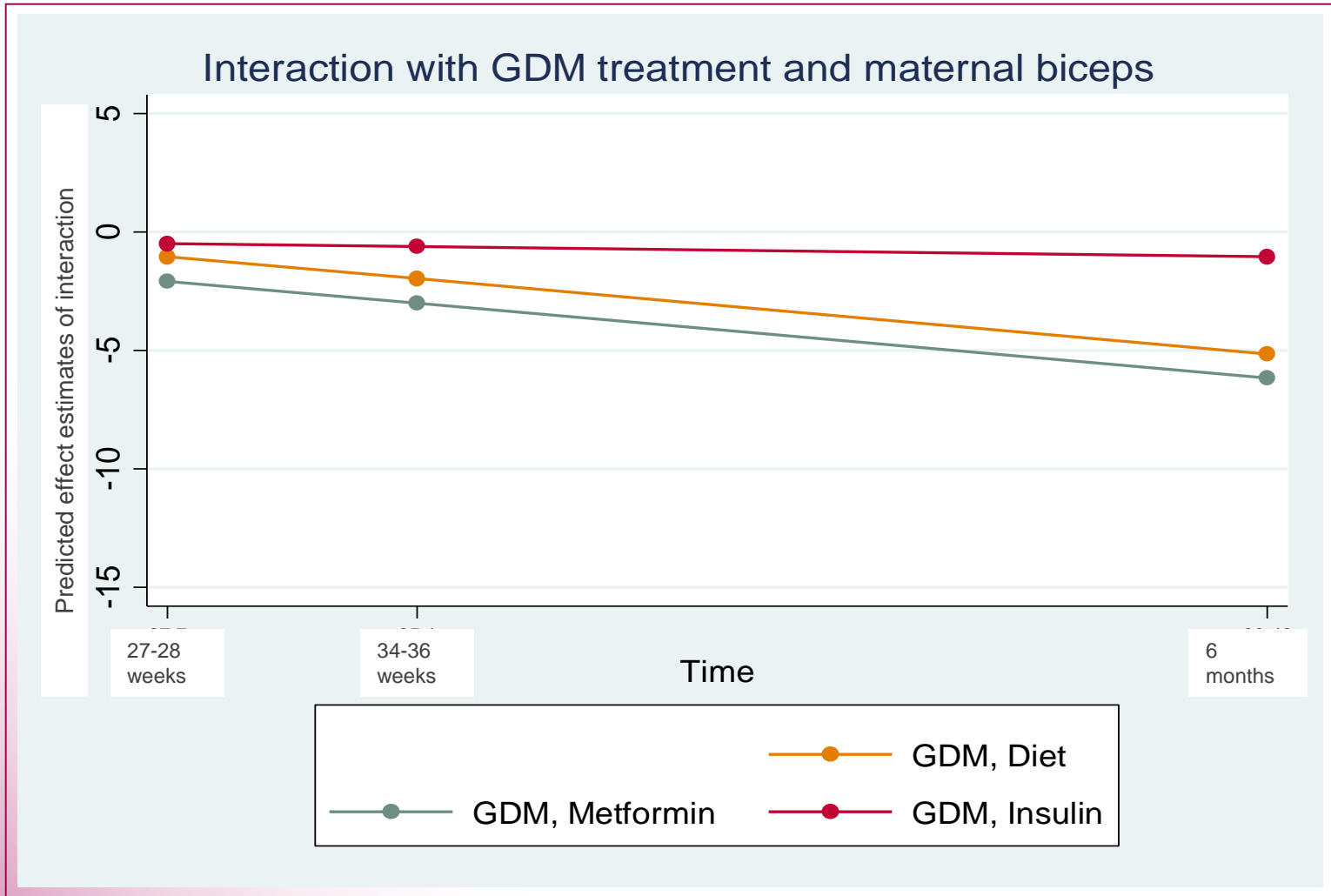
Rate of change in skinfold thicknesses in obese pregnant women with and without GDM.

34-36 weeks to 6 months postpartum.

	Difference in rate of change (mm/week)	Adjusted†	
		95% CI	P-value
SSF	- 4.52	-5.97 - -0.03	0.003
Subscapular	-1.19	-3.14 - -0.72	0.054
Suprailiac	-0.93	-2.70 - -0.02	0.173
Triceps	-0.12	-3.24 – 1.49	0.830
Biceps	-0.90	-2.82 - -0.94	0.060

* Values are adjusted for Maternal Age, BMI, parity, ethnicity and socioeconomic status

Interaction with GDM treatment (diet, metformin, insulin) and maternal biceps skinfold thicknesses at 6 months postpartum.



- Women with GDM have a significantly different pattern of adipose tissue deposition during pregnancy.
- GDM treatment (diet/metformin) reduces adiposity during pregnancy in obese pregnant women, which may reduce risk in future pregnancy.
- Further work;
 - Assess changes in metabolic profile associated with maternal anthropometry throughout pregnancy and the post-partum period
 - Determine future maternal cardiometabolic risk

With thanks to the UPBEAT team and all funders



EARLY NUTRITION

Long-term effects of early nutrition on later health

Tommy's

Guy's and St Thomas' **NHS**
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UPBEAT
for Pregnancy, Infant, Growth and Activity Trial



Guy's, King's and St Thomas's
Medical School