



Limited predictive value of first-trimester biomarkers for fetal growth in low-risk pregnancies

Francesca Arcieri¹, Adele Vasta¹, Valentina D'Ambrosio², Daniele Di Mascio¹, Maria Caterina Corigliano², Antonella Giancotti¹

¹ Department of Maternal and Child Health and Urological Sciences, Sapienza University of Rome, Rome, Italy

² Azienda Ospedaliero-Universitaria Policlinico Umberto I, Rome, Italy

INTRODUCTION

Fetal growth is influenced by maternal, fetal and placental factors that may already be detectable in the first trimester. However, the relationship between early fetal biometry and subsequent birth weight remains poorly defined in low-risk pregnancies.

OBJECTIVE

To investigate the association between first-trimester fetal abdominal circumference (AC) percentile and birth-weight percentile in uncomplicated singleton pregnancies.

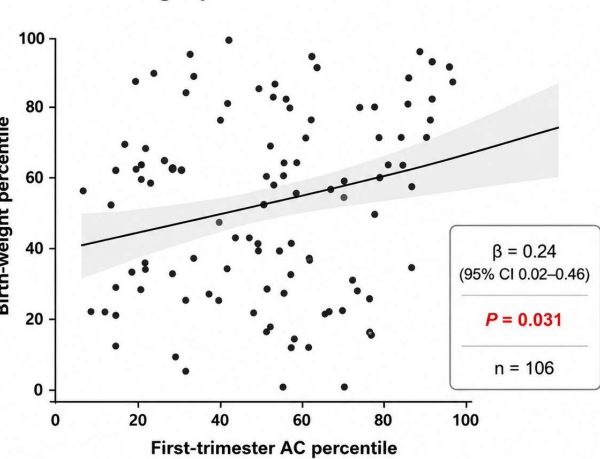
MATERIALS AND METHODS

- Retrospective observational study of singleton pregnancies undergoing first-trimester screening (11–13+6 weeks) at Sapienza University of Rome (December 2023–December 2025).
- Pregnancies complicated by GDM, hypertensive disorders, preterm delivery (<37 weeks), or chromosomal abnormalities **were excluded**.
- First-trimester AC percentile, PAPP-A MoM, free β -hCG MoM and mean UtA-PI were evaluated in relation to INTERGROWTH-21st birth-weight percentile using univariable and multivariable linear regression.

STUDY POPULATION					N = 135
MATERNAL CHARACTERISTICS					
 Age 30.0 y (26.0–35.0)	 BMI 23.0 kg/m² (20.8–25.8)	 Nulliparous 65.2%	 Smoking 15.6%	 Spontaneous conception 89.6%	
FETAL GROWTH & BIRTH					
 AC percentile (11–13+6 w) 49.5 (29.0–67.0)	 Delivery (weeks) 39.0 (38.1–40.0)	 Birth weight (g) 3200 (2932–3468)	 BW percentile (INTERGROWTH-21st) 54.5 (27.2–71.6)		
SGA <10th percentile 4.4%		Severe SGA <3rd percentile 2.2%		LGA >90th percentile 7.4%	

FIGURE 1

Association between first-trimester AC percentile and birth-weight percentile



Higher first-trimester AC percentile was associated with higher birth-weight percentile ($\beta = 0.24$, 95% CI 0.02–0.46; $P = 0.031$).

► Substantial interindividual variability was observed.

FIGURE 2 Primary multivariable model

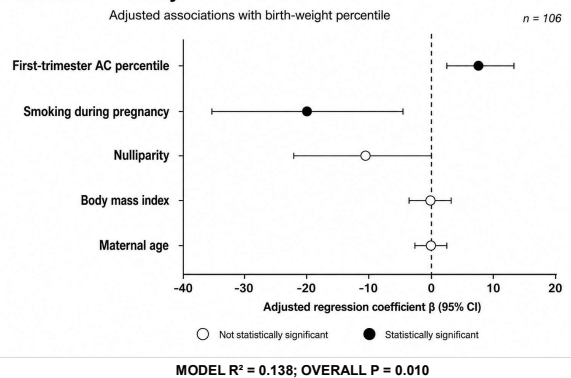
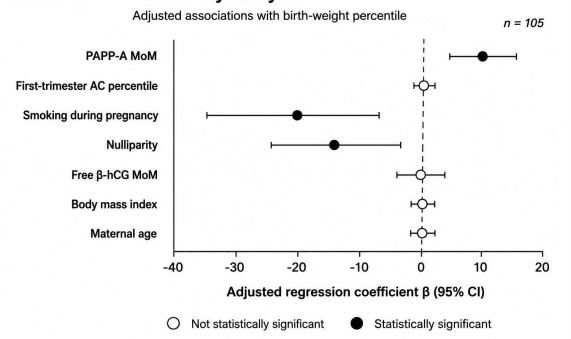


FIGURE 3 Sensitivity analysis



CONCLUSION

First-trimester fetal AC percentile was associated with birth-weight percentile in low-risk pregnancies. However, substantial interindividual variability was observed, the primary multivariable model explained only 13.8% of birth-weight percentile variability, and the association with AC was attenuated after inclusion of placental biomarkers.

TAKE-HOME MESSAGE

Early fetal growth trajectories may already be detectable in the first trimester, but first-trimester markers alone have limited ability to explain subsequent birth-weight variability.