

Table S1. Maternal characteristics in the study of gestational weight gain in early pregnancy (≤ 17 week)

Characteristic	Below (n=186)	Average (n=1233)	Above (n=186)	P
Maternal age (year), mean \pm SD	28.2 \pm 3.4	29.4 \pm 3.7	29.4 \pm 3.5	0.0002
Maternal age ≥ 35 years, n (%)	11 (5.9)	126 (10.2)	14 (7.5)	0.5946
Nulliparous, n (%)	165 (88.7)	1011 (82)	155 (83.3)	0.1683
Education, university degree and above, n (%)	164 (88.1)	1138 (92.4)	162 (87.6)	0.8411
ART, n (%)	4 (2.2)	27 (2.2)	5 (2.7)	0.9110
Tobacco smoking, n (%)	4 (2.2)	26 (2.1)	9 (4.8)	0.0924
Alcohol use, n (%)	15 (8.1)	129 (10.5)	18 (9.37)	0.5876
Pre-pregnancy BMI (kg/m ²), mean \pm SD	21.8 \pm 3.1	21.2 \pm 3.0	21.7 \pm 3.1	0.0027
Pre-pregnancy BMI categories, n (%)				
Underweight (< 18.5 kg/m ²)	28 (15.1)	193 (15.7)	28 (15.1)	
Normal weight (18.5–24.9 kg/m ²)	134 (72)	929 (75.3)	133 (71.5)	0.9848
Overweight and obese (≥ 25 kg/m ²)	24 (12.9)	111 (9)	25 (13.4)	
Gestational age at the first prenatal visit (week), median (IQR)	14 (3)	14 (3)	15 (3)	0.8298
GWG in early pregnancy by BMI categories (kg), mean \pm SD				
All women	-2.5 \pm 2.0	2.1 \pm 1.5	6.7 \pm 2.1	<0.0001
Underweight (< 18.5 kg/m ²)	-0.6 \pm 1.1	2.1 \pm 1.2	6.4 \pm 2.1	<0.0001
Normal weight (18.5–24.9 kg/m ²)	-2.5 \pm 1.7	2.1 \pm 1.5	7.0 \pm 2.1	<0.0001
Overweight and obese (≥ 25 kg/m ²)	-4.7 \pm 1.7	1.5 \pm 1.8	5.7 \pm 1.7	<0.0001
GWG in late pregnancy by BMI categories (kg), mean \pm SD				
All women	12.5 \pm 2.3	12.6 \pm 2.3	12.3 \pm 2.4	0.4854

Underweight (< 18.5 kg/m ²)	12.4 ± 1.9	12.7 ± 1.9	12.5 ± 1.8	0.6323
Normal weight (18.5–24.9 kg/m ²)	12.8 ± 2.2	12.7 ± 2.2	12.6 ± 2.1	0.8492
Overweight and obese (≥ 25 kg/m ²)	10.7 ± 2.2	11.1 ± 3.1	10.4 ± 3.3	0.5676
Gestational age at delivery (week), median (IQR)	39 (2)	39 (2)	39 (2)	0.9126
Birth weight (g), mean ± SD	3296 ± 435	3370 ± 446	3382 ± 515	0.0428
Male infant, n (%)	92 (50.3)	646 (53.2)	102 (55.4)	0.6091

ART: assisted reproductive technology; BMI: body mass index; GWG: gestational weight gain; IQR: interquartile range; SD: standard deviation.

Table S2. Maternal characteristics in the study of gestational weight gain in late pregnancy (>17 week)

Characteristic	Below (n=236)	Average (n=1233)	Above (n=248)	P
Maternal age (year), mean \pm SD	30.4 \pm 3.8	29.4 \pm 3.7	27.9 \pm 3.5	<0.0001
Maternal age \geq 35 years, n (%)	37 (15.7)	126 (10.2)	10 (4)	<0.0001
Nulliparous, n (%)	183 (77.5)	1011 (82)	234 (94.4)	<0.0001
Education, university degree and above, n (%)	222 (94.1)	1138 (92.4)	214 (86.3)	0.0017
ART, n (%)	7 (3)	27 (2.2)	6 (2.4)	0.7701
Tobacco smoking, n (%)	4 (1.7)	26 (2.1)	12 (4.8)	0.0234
Alcohol use, n (%)	20 (8.5)	129 (10.5)	20 (8.1)	0.3841
Pre-pregnancy BMI (kg/m ²), mean \pm SD	21.6 \pm 3.1	21.2 \pm 3.0	21.4 \pm 3.1	0.0564
Pre-pregnancy BMI categories, n (%)				
Underweight (< 18.5 kg/m ²)	29 (12.3)	193 (15.7)	37 (14.9)	
Normal weight (18.5–24.9 kg/m ²)	178 (75.4)	929 (75.3)	189 (76.2)	0.3711
Overweight and obese (\geq 25 kg/m ²)	29 (12.3)	111 (9)	22 (8.9)	
Gestational age at the first prenatal visit (week), median (IQR)	14 (3)	14 (3)	14 (3)	0.4231
GWG in early pregnancy by BMI categories (kg), mean \pm SD				
All women	2.1 \pm 1.5	2.1 \pm 1.5	2.3 \pm 1.4	0.1943
Underweight (< 18.5 kg/m ²)	2.7 \pm 1.4	2.1 \pm 1.2	2.8 \pm 1.3	0.0009
Normal weight (18.5–24.9 kg/m ²)	2.1 \pm 1.5	2.1 \pm 1.5	2.2 \pm 1.5	0.7273
Overweight and obese (\geq 25 kg/m ²)	1.5 \pm 1.6	1.5 \pm 1.8	2.1 \pm 1.2	0.2109
GWG in late pregnancy by BMI categories (kg), mean \pm SD				
All women	7.0 \pm 2.1	12.6 \pm 2.3	19.1 \pm 2.4	<0.0001

Underweight (< 18.5 kg/m ²)	7.9 ± 1.2	12.7 ± 1.9	19.2 ± 2.6	<0.0001
Normal weight (18.5–24.9 kg/m ²)	7.3 ± 1.9	12.7 ± 2.2	19.1 ± 2.2	<0.0001
Overweight and obese (≥ 25 kg/m ²)	4.1 ± 1.9	11.1 ± 3.1	18.3 ± 3.2	<0.0001
Gestational age at delivery (week), median (IQR)	39 (2)	39 (2)	39 (2)	0.0872
Birth weight (g), mean ± SD	3261 ± 397	3370 ± 446	3536 ± 461	<0.0001
Male infant, n (%)	110 (47.8)	646 (53.2)	120 (49)	0.8381

ART: assisted reproductive technology; BMI: body mass index; GWG: gestational weight gain; IQR: interquartile range; SD: standard deviation.

Table S3. Association of pregnancy outcomes by gestational weight gain in early pregnancy (≤ 17 week)

Outcomes	Below (n=186)		Average (n=1233)		Above (n=186)	
	n (%)	aRR (95% CI)	n (%)	aRR	n (%)	aRR (95% CI)
GDM	18 (9.7)	1.19 (0.74, 1.91)	97 (7.9)	Reference	25 (13.4)	1.66 (1.11, 2.48)*
PIH	3 (1.6)	0.42 (0.13, 1.34)	44 (3.6)	Reference	11 (5.9)	1.58 (0.83, 3.00)
Caesarean section	71 (41)	0.87 (0.72, 1.04)	548 (47.3)	Reference	101 (56.7)	1.21 (1.05, 1.39)*
Preterm birth	9 (4.8)	1.17 (0.59, 2.33)	54 (4.4)	Reference	11 (5.9)	1.31 (0.70, 2.46)
NICU admission	24 (12.9)	0.95 (0.65, 1.39)	168 (13.6)	Reference	31 (16.7)	1.22 (0.88, 1.70)
Neonatal hospitalisation ≥ 5 d	12 (6.5)	1.01 (0.59, 1.73)	71 (5.8)	Reference	17 (9.1)	1.56 (1.03, 2.38)*
Severe neonatal problem	2 (1.1)	0.47 (0.11, 1.94)	26 (2.1)	Reference	6 (3.2)	1.48 (0.63, 3.50)
Neonatal hyperbilirubinemia	30 (16.1)	1.03 (0.72, 1.46)	191 (15.5)	Reference	24 (12.9)	0.83 (0.56, 1.23)
LGA $> 90^{\text{th}}$	17 (9.3)	0.81 (0.50, 1.31)	132 (10.9)	Reference	23 (12.5)	1.09 (0.73, 1.65)
SGA $< 10^{\text{th}}$	11 (6)	1.24 (0.67, 2.30)	60 (5)	Reference	8 (4.3)	0.72 (0.48, 1.12)
Macrosomia	11 (5.9)	0.83 (0.45, 1.52)	84 (6.9)	Reference	16 (8.6)	1.20 (0.72, 1.99)
Low birthweight	6 (3.2)	1.47 (0.61, 3.52)	26 (2.1)	Reference	8 (4.3)	1.96 (0.90, 4.26)

aRR: adjusted relative risk; CI: confidence interval; GDM: gestational diabetes mellitus; LGA: large for gestational age; NICU: neonatal intensive care unit;

PIH: pregnancy-induced hypertension; SGA: small for gestational age.

* $P < 0.05$

Table S4. Association of pregnancy outcomes with gestational weight gain in late pregnancy (>17 week)

Outcomes	Below (n=236)		Average (n=1233)		Above (n=248)	
	n (%)	aRR (95% CI)	n (%)	aRR	n (%)	aRR (95% CI)
GDM	52 (22)	2.67 (1.98, 3.61)*	97 (7.9)	Reference	8 (3.2)	0.41 (0.20, 0.83)*
PIH	7 (3)	0.82 (0.37, 1.78)	44 (3.6)	Reference	15 (6.1)	1.52 (0.86, 2.69)
Caesarean section	105 (46.9)	0.93 (0.80, 1.08)	548 (47.3)	Reference	129 (56.3)	1.24 (1.09, 1.41)*
Preterm birth	6 (2.5)	0.50 (0.20, 1.24)	54 (4.4)	Reference	12 (4.8)	1.12 (0.59, 2.12)
NICU admission	35 (14.8)	1.11 (0.80, 1.55)	168 (13.6)	Reference	27 (10.9)	0.76 (0.53, 1.10)
Neonatal hospitalisation ≥5 d	14 (5.9)	1.13 (0.65, 1.97)	71 (5.8)	Reference	11 (4.4)	0.78 (0.43, 1.43)
Severe neonatal problem	6 (2.5)	1.60 (0.67, 3.80)	26 (2.1)	Reference	7 (2.8)	1.28 (0.58, 2.84)
Neonatal hyperbilirubinemia	28 (11.9)	0.77 (0.53, 1.12)	191 (15.5)	Reference	25 (10.1)	0.64 (0.43, 0.94)*
LGA > 90 th	9 (3.9)	0.31 (0.16, 0.60)*	132 (10.9)	Reference	51 (20.8)	2.01 (1.50, 2.70)*
SGA < 10 th	17 (7.4)	1.68 (1.00, 2.82)*	60 (5)	Reference	3 (1.2)	0.24 (0.07, 0.75)*
Macrosomia	5 (2.1)	0.30 (0.12, 0.73)*	84 (6.9)	Reference	31 (12.6)	1.90 (1.30, 2.78)*
Low birthweight	8 (3.4)	1.69 (0.78, 3.68)	26 (2.1)	Reference	3 (1.2)	0.54 (0.16, 1.76)

aRR: adjusted relative risk; CI: confidence interval; GDM: gestational diabetes mellitus; LGA: large for gestational age; NICU: neonatal intensive care unit;

PIH: pregnancy-induced hypertension; SGA: small for gestational age.

* $P < 0.05$

Table S5. Association of pregnancy outcomes with gestational weight gain in late pregnancy (>17 week), by infant sex (27 sex unknown)

Outcomes	Male					Female				
	Below		Average		Above	Below		Average		Above
	(n=110)		(n=646)	(n=646)	(n=120)	(n=120)	(n=120)	(n=569)	(n=569)	(n=125)
	n (%)	aRR (95% CI)	n (%)	n (%)	aRR (95% CI)	n (%)	aRR (95% CI)	n (%)	n (%)	aRR (95% CI)
GDM	21(19.1)	2.41 (1.52, 3.84)*	53 (8.2)	3 (2.5)	0.30 (0.10, 0.96)*	29(24.2)	2.86 (1.88, 4.35)*	43 (7.6)	5 (4)	0.52 (0.21, 1.28)
PIH	2 (1.8)	0.54 (0.13, 2.22)	25 (3.9)	5 (4.2)	0.95 (0.37, 2.42)	5 (4.2)	1.16 (0.44, 3.04)	19 (3.3)	9 (7.2)	2.31 (1.08, 4.95)
Caesarean section	61 (57)	1.11 (0.93, 1.33)	291 (47.5)	62 (56.4)	1.27 (1.06, 1.52)*	41(36.6)	0.74 (0.57, 0.96)*	250 (47.3)	66 (56.4)	1.23(1.03, 1.48)*
Preterm birth	1 (0.9)	0.16 (0.02, 1.14)	35 (5.4)	7 (5.8)	1.13 (0.51, 2.49)	4 (3.3)	0.97 (0.32, 2.91)	17 (3)	4 (3.2)	1.23 (0.42, 3.62)
NICU admission	16(14.6)	1.28 (0.77, 2.13)	86 (13.3)	12 (10)	0.74 (0.42, 1.30)	16(13.3)	0.88 (0.58, 1.35)	75 (13.2)	14 (11.2)	0.84 (0.54, 1.30)
Neonatal hospitalisation ≥5 d	5 (4.6)	0.84 (0.33, 2.13)	42 (6.5)	4 (3.3)	0.52 (0.19, 1.41)	6 (5)	0.83 (0.42, 1.64)	28 (4.9)	7 (5.6)	0.87 (0.47, 1.59)
Severe neonatal problem	0	NA	17 (2.6)	4 (3.3)	1.41 (0.48, 4.10)	5 (4.2)	2.39 (0.88, 6.54)	9 (1.6)	3 (2.4)	1.22 (0.35, 4.27)
Neonatal hyperbilirubinemia	13(11.8)	0.80 (0.47, 1.37)	100 (15.5)	9 (7.5)	0.46 (0.24, 0.89)*	15(12.5)	0.78 (0.47, 1.30)	90 (15.8)	16 (12.8)	0.79 (0.48, 1.30)
LGA > 90 th	2 (1.8)	0.18 (0.04, 0.73)*	62 (9.7)	25 (20.8)	2.18 (1.43, 3.32)*	7 (5.8)	0.38 (0.18, 0.81)*	70 (12.3)	26 (20.8)	1.74 (1.17, 2.61)*
SGA < 10 th	8 (7.3)	1.31 (0.64, 2.70)	37 (5.8)	2 (1.7)	0.28 (0.07, 1.13)	9 (7.5)	1.97 (0.94, 4.15)	23 (4)	1 (0.8)	0.17 (0.02, 1.27)
Macrosomia	3 (2.7)	0.33 (0.11, 1.04)	50 (7.8)	19 (15.8)	2.05 (1.27, 3.31)*	2 (1.7)	0.26 (0.06, 1.05)	33 (5.8)	12 (9.6)	1.71 (0.92, 3.19)
Low birthweight	2 (1.8)	0.95 (0.22, 4.11)	14 (2.2)	1 (0.8)	0.34 (0.05, 2.59)	5 (4.2)	2.48 (0.87, 7.11)	10 (1.8)	1 (0.8)	0.42 (0.05, 3.29)

aRR: adjusted relative risk; CI: confidence interval; GDM: gestational diabetes mellitus; LGA: large for gestational age; NICU: neonatal intensive care unit; PIH: pregnancy-induced

hypertension; SGA: small for gestational age.

* $P < 0.05$

Table S6. Association of pregnancy outcomes with total gestational weight gain

Outcome	Below (n=392)		Average (n=1842)		Above (n=396)	
	n (%)	aRR (95% CI)	n (%)	aRR	n (%)	aRR (95% CI)
GDM	60 (15.3)	1.51 (1.15, 1.98) *	176 (9.6)	Reference	27 (6.8)	0.72 (0.49, 1.07)
PIH	6 (1.5)	0.43 (0.19, 0.97) *	65 (3.5)	Reference	26 (6.6)	1.78 (1.14, 2.76) *
Caesarean section	163 (45)	0.96 (0.85, 1.09)	778 (45.2)	Reference	203 (55.5)	1.20 (1.08, 1.32) *
Preterm birth	15 (3.8)	0.83 (0.47, 1.45)	81 (4.4)	Reference	22 (5.6)	1.35 (0.85, 2.13)
NICU admission	61 (15.6)	1.08 (0.85, 1.36)	257 (14)	Reference	45 (11.4)	0.78 (0.59, 1.04)
Neonatal hospitalisation \geq 5 d	27 (6.9)	1.19 (0.82, 1.72)	107 (5.8)	Reference	19 (4.8)	0.78 (0.50, 1.23)
Severe neonatal problem	11 (2.8)	1.48 (0.78, 2.81)	37 (2)	Reference	7 (1.8)	0.82 (0.37, 1.79)
Neonatal hyperbilirubinemia	58 (14.8)	0.97 (0.75, 1.26)	285 (15.5)	Reference	47 (11.9)	0.75 (0.56, 1.00)
LGA > 90 th	20 (5.2)	0.48 (0.30, 0.74) *	192 (10.6)	Reference	80 (20.4)	1.91 (1.51, 2.42) *
SGA < 10 th	27 (7)	1.53 (1.01, 2.32) *	87 (4.8)	Reference	10 (2.5)	0.54 (0.28, 1.02)
Macrosomia	11 (2.8)	0.44 (0.24, 0.80) *	115 (6.3)	Reference	53 (13.5)	2.16 (1.60, 2.93) *
Low birthweight	15 (3.8)	1.72 (0.96, 3.08)	41 (2.2)	Reference	9 (2.3)	1.04 (0.51, 2.12)

aRR: adjusted relative risk; CI: confidence interval; GDM: gestational diabetes mellitus; LGA: large for gestational age; NICU: neonatal intensive care unit;

PIH: pregnancy-induced hypertension; SGA: small for gestational age.

* $P < 0.05$