

Pregnancy outcome according to maternal pre-pregnancy body mass index in women with twin pregnancy



Sir-yeon Hong, Seo-Yeon Kim, Suk-Joo Choi, Ji-Hee Jung, Soo-Young Oh, Cheong-Rae Roh



Department of Obstetrics and Gynecology, Samsung Medical Center
Sungkyunkwan University School of Medicine
Seoul, South Korea

Introduction

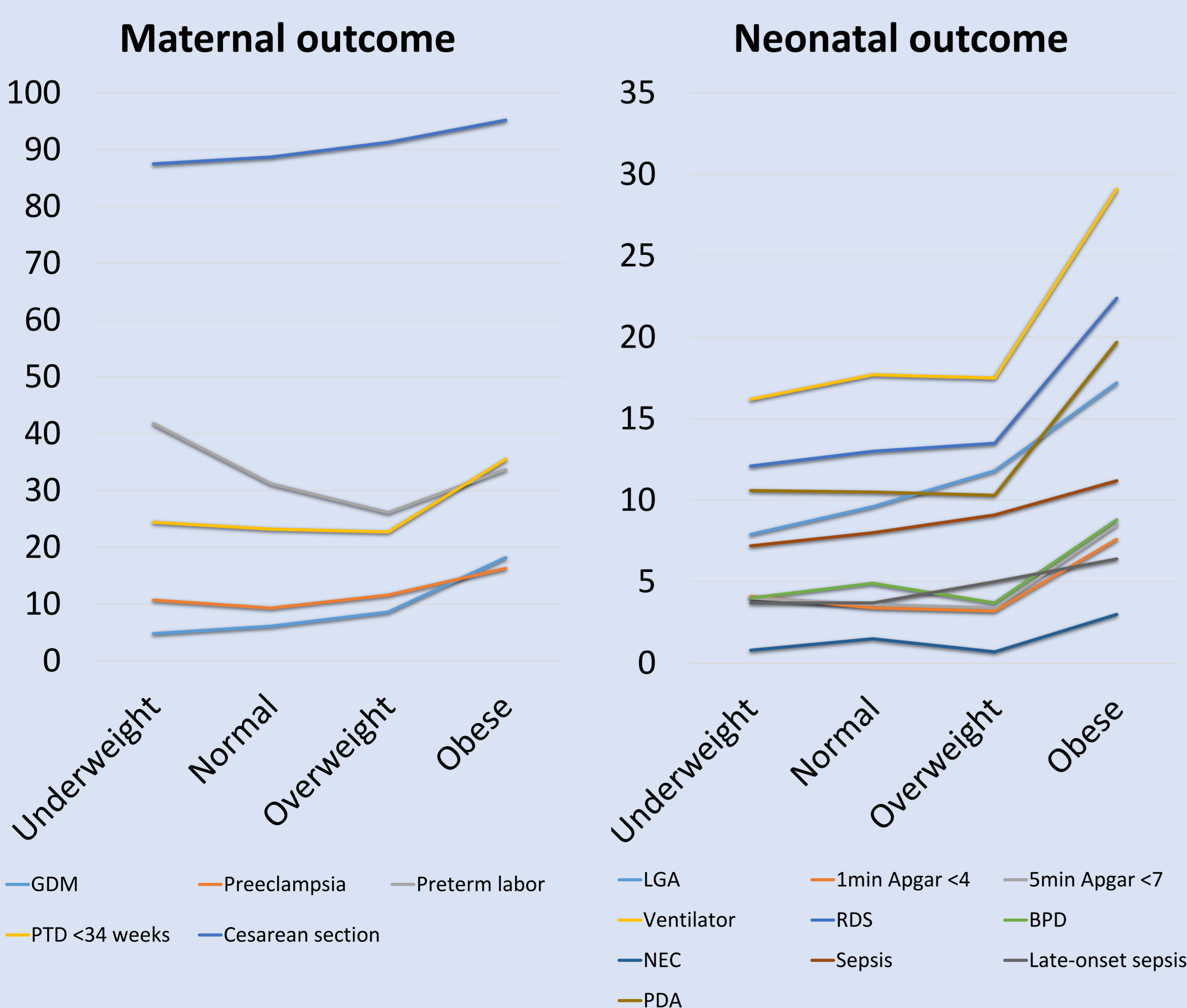
- Both multiple pregnancy and maternal obesity are risk factors of several adverse pregnancy outcomes.
- We explored the association between maternal pre-pregnancy body mass index (BMI) and pregnancy outcomes in women with twin pregnancy.

Material and Methods

- This was a retrospective cohort study of 1,937 women with twin pregnancy who delivered in a single institution between 1995 and 2018. Pregnant women with monoamniotic twins, twin-twin transfusion syndrome, and unknown BMI status were excluded.
- Subjects were categorized into four groups according to pre-pregnancy BMI: underweight ($<18.5 \text{ kg/m}^2$) ($n=328$), normal ($18.5\text{--}22.9 \text{ kg/m}^2$) ($n=1,236$), overweight ($23.0\text{--}24.9 \text{ kg/m}^2$) ($n=207$), and obese ($\geq 25.0 \text{ kg/m}^2$) ($n=166$). Pregnancy outcomes and neonatal outcomes were reviewed.

Results

- Maternal age, proportion of multipara, and history of previous preterm delivery significantly increased with increase in maternal pre-pregnancy BMI.
- The incidences of gestational diabetes, preeclampsia, preterm labor, preterm delivery before 34 weeks of gestation, and cesarean section rate significantly increased with the increase in maternal pre-pregnancy BMI.
- In neonatal outcomes, the risk of large-for-gestational age, low Apgar scores, requirement of mechanical ventilation support, respiratory distress syndrome, bronchopulmonary dysplasia, necrotizing enterocolitis, and sepsis significantly increased with the increase in maternal pre-pregnancy BMI.



Conclusion

- In twin pregnancy, higher maternal pre-pregnancy BMI was associated with higher risk of maternal or neonatal adverse outcomes.

Table 1. Maternal baseline characteristics

	Under-weight (n=328)	Normal (n=1236)	Over-weight (n=207)	Obese (n=166)	P-value
Maternal age (years)	31.2±3.5	32.1±3.8	32.9±4.2	33.0±4.0	<0.001
Maternal age ≥35y	56 (17.1)	310 (25.1)	71 (34.3)	60 (36.1)	<0.001
Nulliparity	278 (84.8)	960 (77.7)	140 (67.6)	111 (66.9)	<0.001
History of PTD	6 (1.8)	47 (3.8)	9 (4.3)	9 (5.4)	0.040
Pre-pregnancy weight (kg)	46.4±3.6	53.3±4.3	61.5±4.0	73.4±10.3	<0.001
Pre-pregnancy height (cm)	162.5±4.8	161.3±5.0	160.6±5.0	161.1±5.8	<0.001
Pre-pregnancy BMI (kg/m ²)	17.5±0.8	20.5±1.2	23.8±0.6	28.2±3.3	<0.001
Weight at delivery (kg)	62.5±7.0	70.0±7.6	77.3±7.8	87.1±13.9	<0.001
Weight gain during pregnancy (kg)	15.8±5.8	16.4±6.0	15.5±6.5	13.4±8.4	0.001
Type of conception					0.947
Spontaneous	172 (52.4)	665 (53.8)	112 (54.1)	87 (52.4)	
ART	156 (47.6)	571 (46.2)	95 (45.9)	79 (47.6)	
Placental chorionicity					0.802
Monochorionic	72 (22.0)	270 (21.8)	38 (18.4)	38 (22.9)	
Dichorionic	256 (78.0)	966 (78.2)	169 (81.6)	128 (77.1)	

Table 2. Pregnancy outcomes

	Under-weight (n=328)	Normal (n=1236)	Over-weight (n=207)	Obese (n=166)	P-value
GDM	13 (4.8)	64 (6.1)	15 (8.6)	24 (18.2)	<0.001
Placenta previa	6 (1.8)	33 (2.7)	3 (1.4)	3 (1.8)	0.713
Placenta abruptio	8 (2.4)	30 (2.4)	6 (2.9)	6 (3.6)	0.403
IIOC	4 (1.2)	26 (2.1)	5 (2.4)	5 (3.0)	0.173
Major congenital anomaly	18 (5.5)	62 (5.0)	19 (9.2)	12 (7.2)	0.105
FDIU	3 (0.9)	23 (1.9)	7 (3.4)	2 (1.2)	0.359
Preeclampsia	35 (10.7)	115 (9.3)	24 (11.6)	27 (16.3)	0.044
Preterm labor	137 (41.8)	386 (31.2)	54 (26.1)	56 (33.7)	0.013
PPROM	55 (16.8)	219 (17.7)	32 (15.5)	38 (22.9)	0.236
GA at delivery (week)	35.1±3.0	35.1±3.2	35.2±3.2	34.1±4.0	0.513
PTD <34 weeks	80 (24.4)	287 (23.2)	47 (22.7)	59 (35.5)	0.023
PTD <37 weeks	218 (66.5)	782 (63.3)	127 (61.4)	116 (69.9)	0.734
Cesarean section	287 (87.5)	1096 (88.7)	189 (91.3)	158 (95.2)	0.005

Table 3. Neonatal outcomes

	Under-weight (n=656)	Normal (n=2472)	Over-weight (n=414)	Obese (n=332)	P-value
Sex (male)	295 (45.0)	1229 (49.7)	188 (45.4)	164 (49.4)	0.494
Birth weight (kg)	2.2±0.6	2.2±0.6	2.2±0.6	2.1±0.7	0.082
SGA	65 (9.9)	204 (8.3)	48 (11.6)	20 (6.0)	0.316
LGA	52 (7.9)	236 (9.6)	49 (11.8)	57 (17.2)	<0.001
1-min Apgar <4	27 (4.1)	83 (3.4)	13 (3.2)	25 (7.6)	0.031
5-min Apgar <7	26 (4.0)	89 (3.6)	14 (3.4)	28 (8.5)	0.005
NICU admission	280 (42.9)	995 (40.6)	158 (38.9)	152 (46.1)	0.632
Mechanical ventilation	106 (16.2)	434 (17.7)	71 (17.5)	96 (29.1)	<0.001
Morbidity					
RDS	79 (12.1)	319 (13.0)	55 (13.5)	74 (22.4)	<0.001
BPD	26 (4.0)	120 (4.9)	15 (3.7)	29 (8.8)	0.011
TTN	21 (3.2)	65 (2.7)	9 (2.2)	8 (2.4)	0.364
IVH	4 (0.6)	30 (1.2)	5 (1.2)	4 (1.2)	0.387
PVL	5 (0.8)	20 (0.8)	2 (0.5)	7 (2.1)	0.104
NEC	5 (0.8)	37 (1.5)	3 (0.7)	10 (3.0)	0.035
Sepsis	47 (7.2)	195 (8.0)	37 (9.1)	37 (11.2)	0.023
Early-onset sepsis	27 (4.1)	127 (5.2)	17 (4.2)	21 (6.4)	0.279
Late-onset sepsis	24 (3.7)	89 (3.7)	20 (5.0)	21 (6.4)	0.023
ROP (grade III)	9 (1.4)	49 (2.0)	4 (1.0)	13 (4.0)	0.053
PDA	69 (10.6)	257 (10.5)	42 (10.3)	65 (19.7)	<0.001
Hypoglycemia	23 (3.5)	95 (3.9)	9 (2.2)	9 (2.7)	0.234
Hypothermia	2 (0.3)	2 (0.1)	1 (0.2)	1 (0.3)	0.853
Hyperbilirubinemia	190 (29.1)	706 (28.8)	114 (28.1)	106 (32.1)	0.469
Mortality					
Neonatal	7 (1.1)	42 (1.7)	10 (2.5)	7 (2.1)	0.115
Perinatal	5 (0.8)	29 (1.2)	8 (2.0)	5 (1.5)	0.135
Perinatal	8 (1.2)	53 (2.1)	16 (3.9)	7 (2.1)	0.069