

Supplemental Table 1. Participant Characteristics Stratified by Study Site

Participant Characteristics	Iowa (n=20)	Pittsburgh (n=100)	p-value
Age, mean years \pm SD	30.5 \pm 4.3	31.2 \pm 4.8	0.532
Race, n(%)			0.084
Black	0 (0.0)	18 (18.0)	
White	19 (95.0)	75 (75.0)	
Other	1 (5.0)	7 (7.0)	
Education, n(%)			0.630
High school or less	2 (10.0)	10 (10.0)	
Some college/associate degree	6 (30.0)	21 (21.0)	
Bachelor's degree	6 (30.0)	25 (25.0)	
Graduate degree	6 (30.0)	44 (44.0)	
Parity, n(%)			0.508
Primipara	7 (35.0)	43 (43.0)	
Multipara	13 (65.0)	57 (57.0)	
Pregnancy history, n(%) ^a			
Gestational hypertension	1 (5.0)	4 (7.0)	
Preeclampsia	1 (5.0)	6 (10.7)	0.999
Preterm birth	2 (10.0)	6 (10.5)	0.669
Gestational diabetes	2 (10.0)	3 (5.3)	0.277
Prepregnancy BMI, mean kg/m ² \pm SD	29.2 \pm 5.6	26.3 \pm 6.8	0.076
Prepregnancy BMI category, n(%)			
Underweight (<18.5 kg/m ²)	0 (0.0)	5 (5.0)	
Normal (18.5-24.9 kg/m ²)	5 (25.0)	47 (47.0)	
Overweight (25.0-29.9 kg/m ²)	4 (20.0)	24 (24.0)	
Obese (\geq 30.0 kg/m ²)	11 (55.0)	24 (24.0)	
Gestational age at delivery, mean weeks \pm SD	38.4 \pm 1.2	39.2 \pm 1.7	0.071
SED trajectory groups, n(%)			0.268
Low	5 (25.0)	20 (20.0)	
Moderate	4 (20.0)	39 (39.0)	
High	11 (55.0)	41 (41.0)	
MVPA trajectory groups, n(%)			0.026
Low	11 (55.0)	24 (24.0)	
Moderate	7 (35.0)	52 (52.0)	
High	2 (10.0)	24 (24.0)	
Pregnancy outcomes			
All APOs, n(%) ^b	8 (40.0)	19 (19.0)	0.040
Hypertensive disorders, n(%)	7 (35.0)	13 (13.0)	0.017
Excessive GWG, n(%)	11 (55.0)	49 (49.0)	0.684

Abbreviations: BMI = body mass index; SED = sedentary behavior; MVPA = moderate-to-vigorous-intensity physical activity; APO = adverse pregnancy outcomes; GWG = gestational weight gain.

Bolded values are statistically significant, $p < 0.05$.

^aAmong women with previous pregnancy and delivery (n=72).

^bAPOs include gestational hypertension, preeclampsia, gestational diabetes, foetal growth restriction, and preterm delivery.

Supplemental Table 2. Participant Characteristics Stratified by Sleep Efficiency Trajectory Groups^a

Participant Characteristics	Low Sleep Efficiency (n=20)	High Sleep Efficiency (n=100)	p-value
Age, mean years \pm SD	29.7 \pm 5.3	31.3 \pm 4.6	0.161
Race, n(%)			0.014
Black	6 (30.0)	12 (12.0)	
White	11 (55.0)	83 (83.0)	
Other	3 (15.0)	5 (5.0)	
Education, n(%)			0.001
High school or less	4 (20.0)	8 (8.0)	
Some college/associate degree	10 (50.0)	17 (17.0)	
Bachelor's degree	3 (15.0)	28 (28.0)	
Graduate degree	3 (15.0)	47 (47.0)	
Parity, n(%)			0.508
Primipara	7 (35.0)	43 (43.0)	
Multipara	13 (65.0)	57 (57.0)	
Pregnancy history, n(%) ^b			
Gestational hypertension	0 (0.0)	5 (8.5)	0.577
Preeclampsia	1 (7.7)	6 (10.3)	1.000
Preterm birth	3 (23.1)	5 (8.5)	0.151
Gestational diabetes	0 (0.0)	5 (6.9)	0.577
Prepregnancy BMI, mean kg/m ² \pm SD	29.5 \pm 9.6	26.2 \pm 5.9	0.147
Prepregnancy BMI category, n(%)			0.068
Underweight (<18.5 kg/m ²)	2 (10.0)	3 (3.0)	
Normal (18.5-24.9 kg/m ²)	5 (25.0)	47 (47.0)	
Overweight (25.0-29.9 kg/m ²)	45 (20.0)	26 (26.0)	
Obese (\geq 30.0 kg/m ²)	9 (45.0)	24 (24.0)	
Gestational age at delivery, mean weeks \pm SD	39.1 \pm 1.0	39.0 \pm 1.8	0.793
SED trajectory groups, n(%)			0.069
Low	8 (40.0)	17 (17.0)	
Moderate	4 (20.0)	39 (39.0)	
High	8 (40.0)	44 (44.0)	
MVPA trajectory groups, n(%)			0.363
Low	7 (35.0)	28 (28.0)	
Moderate	7 (35.0)	52 (52.0)	
High	6 (30.0)	20 (20.0)	
Pregnancy outcomes			
All APOs, n(%) ^c	3 (15.0)	24 (24.0)	0.559
Hypertensive disorders, n(%)	2 (10.0)	18 (18.0)	0.521
Excessive GWG, n(%)	13 (68.4)	47 (47.0)	0.133

Abbreviations: BMI = body mass index; SED = sedentary behavior; MVPA = moderate-to-vigorous-intensity physical activity; APO = adverse pregnancy outcomes; GWG = gestational weight gain.

Bolded values are statistically significant, $p < 0.05$.

^aSleep efficiency groups created using latent trajectories.

^bAmong women with previous pregnancy and delivery ($n=72$).

^cAPOs include gestational hypertension, preeclampsia, gestational diabetes, foetal growth restriction, and preterm delivery.

Supplemental Table 3. Participant Characteristics Stratified by Sleep Quality Trajectory Groups^a

Participant Characteristics	Poor Sleep Quality (n=18)	Worsening Sleep Quality (n=28)	Good Sleep Quality (n=74)	p-value
Age, mean years ± SD	30.7 ± 6.1	30.8 ± 4.3	31.2 ± 4.6	0.881
Race, n(%)				
Black	5 (27.8)	3 (10.7)	10 (13.5)	0.162
White	11 (61.1)	25 (89.3)	58 (78.4)	
Other	2 (11.1)	0 (0.0)	6 (8.1)	
Education, n(%)				<0.001
High school or less	3 (16.7)	5 (17.9)	4 (5.4)	
Some college/associate degree	10 (55.6)	7 (25.0)	10 (13.5)	
Bachelor's degree	1 (5.6)	8 (28.6)	22 (29.7)	
Graduate degree	4(22.2)	8 (28.6)	38 (51.4)	
Parity, n(%)				0.678
Primipara	6 (33.3)	13 (46.4)	39 (88.6)	
Multipara	12 (66.7)	15 (53.6)	5 (11.4)	
Pregnancy history, n(%) ^b				
Gestational hypertension	0 (0.0)	0 (0.0)	5 (11.4)	0.336
Preeclampsia	1 (8.3)	0 (0.0)	6 (13.6)	0.389
Preterm birth	2 (16.7)	0 (0.0)	6 (13.6)	0.241
Gestational diabetes	0 (0.0)	1 (6.3)	4 (9.1)	0.818
Prepregnancy BMI, mean kg/m ² ± SD	29.8 ± 10.0	27.3 ± 5.8	25.8 ± 5.9	0.076
Prepregnancy BMI category, n(%)				0.066
Underweight (<18.5 kg/m ²)	2 (11.1)	1 (3.6)	2 (2.7)	
Normal (18.5-24.9 kg/m ²)	6 (33.3)	10 (35.7)	36 (48.7)	
Overweight (25.0-29.9 kg/m ²)	2 (11.1)	6 (21.4)	22 (29.7)	
Obese (≥30.0 kg/m ²)	8 (44.4)	11 (39.3)	14 (18.9)	
Gestational age at delivery, mean weeks ± SD	39.1 ± 1.9	39.2 ± 1.4	38.6 ± 0.9	0.398
SED trajectory groups, n(%)				0.078
Low	5 (27.8)	8 (28.6)	12 (16.2)	
Moderate	3 (16.7)	13 (46.4)	27 (36.5)	
High	10 (55.6)	7 (25.0)	35 (47.3)	
MVPA trajectory groups, n(%)				0.228
Low	7 (38.9)	12 (42.9)	16 (21.6)	
Moderate	7 (38.9)	11 (39.3)	41 (55.4)	
High	4 (22.2)	5 (17.9)	17 (23.0)	
Pregnancy outcomes				
All APOs, n(%) ^c	4 (22.2)	6 (21.4)	17 (23.0)	0.986
Hypertensive disorders, n(%)	3 (16.7)	5 (18.5)	12 (16.2)	0.939
Excessive GWG, n(%)	12 (66.7)	18 (66.7)	30 (41.1)	0.026

Abbreviations: BMI = body mass index; SED = sedentary behavior; MVPA = moderate-to-vigorous-intensity physical activity; APO = adverse pregnancy outcomes; GWG = gestational weight gain.

^aSleep quality trajectory groups created using using latent trajectories.

^bAmong women with previous pregnancy and delivery (n=72).

^cAPOs include gestational hypertension, preeclampsia, gestational diabetes, fetal growth restriction, and preterm delivery.

Supplemental Table 4. Associations of Sleep Measures with Adverse Pregnancy Outcomes with Additional Adjustment for SED and MVPA Trajectories

	All APOs (n=27)	Hypertensive Disorders (n=20)	Excessive GWG (n=60)
Sleep Trajectory Groups^a	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sleep duration			
Short	1.07 (0.29, 3.95)	1.60 (0.34, 7.62)	0.96 (0.31, 2.94)
Adequate	Reference	Reference	Reference
Sleep efficiency			
Low	1.56 (0.35, 7.02)	1.69 (0.28, 10.15)	0.46 (0.14, 1.56)
High	Reference	Reference	Reference
Sleep quality			
Good	Reference	Reference	Reference
Worsening	0.87 (0.26, 2.85)	0.67 (0.17, 2.64)	0.30 (0.10, 0.87)
Poor	1.51 (0.36, 6.40)	1.30 (0.27, 6.34)	0.42 (0.12, 1.41)

Abbreviations: SED = sedentary behavior; MVPA = moderate-to-vigorous intensity physical activity; APO = adverse pregnancy outcomes; GWG = gestational weight gain.

Models adjusted for site, age, race (black vs. non-black), parity (primipara vs. multipara), pre-pregnancy BMI (continuous), gestational age at delivery (excessive GWG model only), SED trajectory, and MVPA trajectory. Bolded values are statistically significant, p<0.05.

^aSleep trajectory groups created using latent trajectories.